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ON THE SCIENCE OF LANGUAGE.*

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In the year 1861, Professor Max Müller, at the request of the Royal Institution of Great Britain, delivered a series of lectures on the Science of Language.† These lectures have since been brought out in a separate volume, with many learned notes and additions; which, in 1862, had reached a third edition. The work embraces nearly everything that could be treated of on the science of language; as the growth in contradistinction to the history of language; the empirical, theoretical, and classificatory stages; the genealogical and morphological classification of languages; comparative grammar; the constituent elements of language; and the origin of languages. These heads include phonetic decay, dialectic regeneration, a discourse on modern languages and dialects, demonstrative roots, the terminational stage, and the natural selection of roots. Although I feel quite unable to criticize, in the way that it deserves, any work from the pen of so distinguished a linguist as Professor Müller, I will nevertheless take the liberty of making a few remarks upon his arduous undertaking. Professor Müller says: "I had lived long enough in England to know that the peculiar difficulties arising from an imperfect knowledge of the language would be more than balanced by the forbearance of an English audience; and I had such perfect faith in my subject, that I thought it might be trusted even in the hands of a less skilful expositor." Any one who has carefully read through the work will doubtless be of opinion that Professor Müller had no need of any forbearance whatever;

* The present article is based upon a paper read before the Anthropological Society of London, June 9th, 1863.

† Lectures on the Science of Language, delivered at the Royal Institution of Great Britain in April, May, and June, 1861, by Max Müller, M.A. London: 8vo, 3rd ed. Longman: 1862.

and that it would be quite as well if authors of the present age would take example from his simple and unaffected style.

Philologists have for a long time bewildered themselves and the rest of the world in their search after a primitive language; and the number of theories thereon, and on the origin and affinities of some of the principal languages, is somewhat amusing. Dr. Murray derives language from nine principal roots, viz., *ag, bag, cwag, dwag, mag, nag, rag, swag, tag,** a theory which I shall take the liberty of christening from the doctor's own roots, the *tag-rag* or *c*(w)*ag-mag* theory. Dr. Schmidt, in a homœopathical manner, derives all Greek words from the root *e*, and all Latin words from the arch-radical *hi*,† in which he and I do not agree.

Most Eastern writers give the preference in point of antiquity to the Syriac: Camden and many learned writers ascribe priority to the Chaldee. Dr. Webster says, "the descendants of Noah journeyed from the East, and settled in the plain of Shinar, or in Chaldea; that the language used at that time by the inhabitants of that plain must then have been the oldest or the primitive language of man; and this must have been the original Chaldee." The Jews contend that the Hebrew language was the most ancient; and with them many Christian writers agree, as Chrysostom, Augustin, Origen, Jerome, among the ancients; Bochart, Heidigger, Buxtorf, Selden, and Dr. Sharpe, among the moderns. Guichard‡ maintained that as Hebrew was written from right to left, and Greek from left to right, Greek words might be traced back to Hebrew by being simply read from right to left. Lord Monboddo says, "I have supposed that language could not be invented without supernatural assistance; and, accordingly, I have maintained that it was the invention of the dæmon kings of Egypt, who, being more than men, first taught themselves to articulate, and then taught others. But, even among them, I am persuaded there was a progress in the art, and that such a language as the Shanskrit was not at once invented."

The Arabs very reasonably dispute the priority of antiquity with the Hebrews; whilst the Armenians consider their language the most ancient, because the ark first rested in Armenia. Again, some authors maintain that the language spoken by Adam is lost, and that the Hebrew, Chaldee, and Arabic are only dialects of the original lan-

* Cf. Max Müller, p. 343.

† Ibid., cf. Curtius, Griechische Etymologie.

‡ L'Harmonie Etymologique des Langues Hébraique, Chaldaique, Syriaque, Greque, Latin, Françoise, Italienne, Espagnole, Allemande, Flamende, Anglaise, etc., par Estienne Guichard. Paris: 1806.

guage; and that Abraham spoke Chaldee before he passed the Euphrates, and that he first acquired a knowledge of Hebrew in the land of Canaan. According to Reading, the Abyssinian was the primitive language; Stiernhielm and Rudbeckius contend for Swedish; Verstegan, Junius, and Ray for Saxon; Skinner for Belgic and Teutonic; Lye for Icelandic; Salmasius, Boxhorn and Aurelius for Scythian; Hugo for Latin; Erici for Greek: whilst others, with more love for their country than for truth, have traced Greek and Latin to German and Celtic. Indeed some have gone so far as to assert that Hebrew and its sister dialect, the Phœnician, are based upon Celtic. Court de Gébélin, in a work in nine quarto volumes,* endeavours to derive Latin and French from a pretended primitive tongue. He considers speech as an instinct, and every language as a dialect of what he calls "primitive, inspired by God Himself, natural, necessary, universal, and imperishable." He treats Persian, Armenian, Malay, and Coptic as dialects of Hebrew; derives Latin from Celtic; and discovers Hebrew, Greek, English, and French words in the idioms of America. Herodotus† tells us, that in consequence of a dispute between the Egyptians and Phrygians concerning the antiquity of their respective languages, Psammetichus, king of Egypt, ordered two children to be brought up with a prohibition that no word should be pronounced in their presence, but that nature should be left to speak for herself; and that the first word they uttered was βεκκος, which in Phrygian signified "bread"; and that the Egyptians, convinced by this experiment, admitted that the Phrygians were more ancient than themselves. Again, a preference in point of antiquity has also been given to the Chinese. It has been urged that the Chinese are the posterity of Noah, and that Fohi, the first king of China, was Noah himself. Mr. Webb, an ingenious writer in the reign of Charles II, strenuously maintains that the Chinese is the only original language, and that it was spoken in Paradise. Its antiquity is said to be strengthened by its singularity, consisting, as it does, of few words, all monosyllables, and from its simplicity of construction, having no variety of declensions, conjugations, or grammatical rules.

Celtic scholars assert their language to be the most ancient.‡

* Le Monde primitif analysé et comparé avec le monde moderne. Paris: 1773; containing etymological vocabularies of the Latin and French languages.

† "Ευτερπή."

‡ Cleland has a partiality for the Celtic. Cf. Fauchet, Antiquités Gauloises; Bacon, Recherches sur les origines Celtiques; Le Brigant, Éléments de la langue des Celtes; Frippault, Celt-hellenisme.

Pezron* and Bullet† have discovered in the Bas Breton the root of all languages. Dr. Armstrong has gone so far as to show Celtic words in the names of places in the New World; leaving us to infer thereby that the Celts had discovered America before the time of Columbus. According to Goropius,‡ the Low Dutch was the language of Paradise. Chardin tells us the Persians believe three languages to have been spoken in Paradise; Arabic by the serpent, Persian by Adam, and Turkish by Gabriel. André Kempe says God spoke to Adam in Swedish, Adam answered in Danish, and the serpent spoke to Eve in French.§ Erro‖ claims Basque as the language spoken by Adam. If we are to believe some writers, the Iberians were the fathers of the human race; and the Basque was not only the original language of Spain, but the primæval language, and that from it all languages have been derived. Their grammarians tell us that it existed before the Tower of Babel, and was brought into Spain by Tubal himself. Perhaps of all writers upon this subject, Larramendi has furnished us with the largest amount of trash. This truth-hating scholiast, in the preface to his *Diccionario Trilingue del Castellano, Bascuence y Latin*,¶ asserts that of all languages the Basque is the most perfect, the most harmonious, the most copious and rich, the most eloquent, the most easy, and the most pleasing in the variety of its dialects; that it cannot be traced to any Oriental language; and that it is not only a primitive language, but *the* primitive language. He states that 1,951 Basque words are found in the Spanish, and that the Greek, Latin, Italian, and French, have derived many words from it. According to D'Abbadie,** "La langue euskarienne date des premiers siècles de notre temps historique; elle naquit durant le premier âge, dans le midi; sa vocalization vierge est divine, sa nomenclature est originale et sans mélange; l'architecture merveilleusement régulière et simple de son système grammatical achève d'en faire le dialecte le plus philosophique, le plus complet du verbe humain. Conservée jusqu'au milieu de l'âge ancien, par les Apothomites, les Anherrites, les Churites, les Muthugores et autres peuplades de la

* Pezron, Antiquité de la langue Celtique.

† Bullet, Mémoire sur la langue Celtique.

‡ Hermathena Joannis Goropii Becani, Antwerpiæ, 1580. Origines, Antverpianæ, 1569.

§ On the Language of Paradise. Cf. Max Müller, p. 131.

‖ El Mundo primitivo filosofico de la Antiquedad y Cultura de la Nacion Bascongada, by J. B. Erro. Madrid: 1815.

¶ San Sebastian, 1745.

** Etudes grammaticales sur la langage Euskarienne, par A. Th. d'Abbadie et J. Augustin Chaho. Paris: 1836. Première partie, p. 3.

Mauritanie primitive, cette langue fleurit en Espagne pendant trois milles ans, avec les Ibères-Euskariens,* jusqu'à l'invasion des Celtes ou Tartares, dont les dialectes grossiers et ténébreux enfantèrent dans nos contrées méridionales la confusion de *Babel.* Il est donc vrai de dire, en allégorie, que la langue *Eskuera,* bien antérieure à l'établissement des barbares dans le midi, tire son origine *d'Adam;* puisque ce mythe génésique représente l'humanité des premiers âges." Again, another writer† contends that as the uncultivated populations of the two Americas could not have sprung from the ground like mushrooms, they must have emigrated from Asia, and the period of their emigration was unknown until recently. He recommends to notice a book written by Ethan Smith, a pastor in Poultney in the United States, entitled *View of the Hebrews,* etc., and comprehending accounts of various English, French, Spanish, and Portuguese tourists, who had made diligent inquiries relative to the aborigines. He says they agree in their accounts as to the primitive settlers of America, that they were all of one stock, viz., of the *ten tribes of Israel,* "who were carried away by the Assyrian kings to Halah and Habbor, the river Gozen (or Ganges), and the cities of Media"; who in a short time, making their way towards the east of Asia, crossed the ice of Behring's Straits, and in time multiplied and extended themselves all over America from north to south. That although the primitive discoverers of America declared the natives to be savages, because they did not possess letters, and were treated as such by the European savages who conquered them, yet modern tourists find them (by the traditions preserved among the natives) to possess religious principles, sentiments, customs and manners, far surpassing our opinions regarding them; all which afford testimony to their having been once of the patriarchal seed of Israel. Quoting from the same work, he says, "they all inform us, agreeably to their traditions, that their primitive parent had twelve sons, of whose descendants they are a portion; that their forefathers, having transgressed against God, were made captives, and carried off far from their own country; that 2,500 years ago their ancestors left the country of their captivity, proceeded towards the east, crossed a river of hardened water, and settled themselves in America. Regarding their religion, they acknowledge a supreme power; they have priests, and some sort of sacrifices; they believe in a future state, and in rewards and punishments; and it is asserted

* Voyage en Navarre pendant l'insurrection des Basques, 1830-1835.

† See Theological and Critical Treatise on the Primogeniture of the Holy Language, by Solomon Bennett. London: 1835. Note, p. 8.

that they use in their prayers many sacred terms with very little deviation in dialect from the original Hebrew; as *Yohewah*, '*Ale* and *Aleim*'; *Yah*, *Halleluwah*; in their political language, *shemin*, 'heaven'; *Shilu*, 'Shiloh'; *abba*, 'father'; *ish* or *ishte*, 'a man'; *ishto*, 'a woman'; *Awah*, 'Eve', *liani*, 'a wife or concubine'; *nichiri*, 'nostrils'; *kora*, 'cold'; *Canaai*, 'Canaan'; *Ararat*, 'high mountain', etc."

Professor Müller devotes considerable space to the discovery of Sanskrit, its development in Europe, its philology, and its affinity with Greek and Latin. It is a singular circumstance that this, the most perfect of all known languages, should have been scarcely known to us before the close of the last century. It was about this epoch that it received a powerful impulse, principally from the necessities of our own government in India. The way was first opened in India by Anquetil Duperron, who was soon followed by Sir Wm. Jones, Colebrooke, Wilkins, Prinsep, and Wilson, author of the celebrated Sanskrit dictionary. In England, the study of this language is chiefly indebted to Haughton; in France,* to Chézy and Eugène Burnouf. In Germany it of course obtained a most cordial reception, its study being principally made known by A. W. von Schlegel, G. von Humboldt, Bopp, Rosen, and Lassen. Von Schlegel and Lassen subsequently founded a Sanskrit school, having for its object not only a well grounded and complete knowledge of the language, but also of the literature and antiquities of India;† and at the present day there are few continental universities where there is not a professor of Sanskrit. It was, indeed, the introduction of Sanskrit to the learned of Europe that gave rise to "Comparative Philology". For this new science we are chiefly indebted to the labours of Bopp, Pott, Grimm, Schlegel, Pictet, Eichhoff, and Vans Kennedy, whose able work on the affinities of languages contains a comparative table of upwards of nine hundred words in Sanskrit, English, Anglo-Saxon, German, Latin, Greek, and Persian. I am, however, disposed to think that many of the words given by these writers as derivatives of Sanskrit are very doubtful; and I could name many that have been omitted.

Considering the interest that the subject has of late awakened, it may not be here thought out of the way to adduce some of the statistics that I have been able to gather on the Sanskrit element to be found in the Old World languages. Upwards of 900 Sanskrit roots have been discovered in the Greek, Latin, Persian, and Gotho-Teu-

* Where it was chiefly introduced through Hamilton in 1804.
† Cf. P. Cyc.; Encyc. des Gens du Monde.

tonic languages. Of these, 263 are found in Persian; 43 in German and not in English, 132 in English and not in German, whilst 119 are common to both English and German. There are 208 in Greek and not in Latin, 188 in Latin and not in Greek, and 131 are common to both Latin and Greek; whilst 31 words are common to all these languages. There are, of course, many Sanskrit roots in the Celtic and Slavonic languages; but the number has not, as far as I am aware, been ascertained. Indeed the Sanskrit roots in some Slavonic dialects probably exceed those in any European language. The Gypsy language, which is of Hindústání origin, possesses a large number of Sanskrit roots;* and the attempt to show a connexion between the Gypsy and Slavonic languages proves rather that analogous words have been derived from a common root—the Sanskrit. In the Siamese, or language of Thai, the Peguan, the Avanese, the Malayálam, Telugu, Karnáta, and Tamil, are found many Sanskrit words. The Malay has 516; the Javanese still more; the Zend has 53, the Cingalese, which is spoken in a great part of Ceylon, has many from the same source. Indeed, not only are most of the proper names in this island mentioned by Ptolemy, but most of the river names found on modern maps may be traced to the Sanskrit. On the other hand, what are termed the Semitic languages, as the Hebrew, Arabic, Syriac, Ethiopic, and Amharic; the Bugis, or language of the Celebes,† the Turkish, the Egyptian dialects, and the Chinese, contain very few words of Sanskrit origin; and the Armenian has probably none which have not crept in through the Greek; and, notwithstanding all that has been advanced to the contrary, I am disposed to think that the Basque does not contain any Sanskrit words which have not been derived through the Greek or Latin. And now with respect to the two hundred and fifty-one Sanskrit roots which have found their way, directly or indirectly, through Greek, Latin, Anglo-Saxon, etc., into the English language. Some of these Sanskrit words are represented by only one English word; whilst others may be discovered in composition of from two words to four thousand words; and if a proper calculation were made, I am disposed to think that these two hundred and fifty-one Sanskrit roots would be found to form part of thirty thousand English words.‡

* Cf. Histoire des Bohémiens, par H. M. G. Grellmann, 8vo, Paris, 1810; also Adelung's Mithridates (Vater), Berlin, 1817, iv, 82-86, which contains a comparative vocabulary of a great many Slavonic and Gypsy words.

† The Bugis has many words from Malay, Tagalish, and Javanese.

‡ As a sample of the fecundity of one Sanscrit word, Professor Müller gives the root *pa's* (with the *s* found in *spa'sa*, a spy), from which he derives, indirectly, the following:—aspect, auspicious, circumspect, conspicuous, expect, inspect, inspection, prospect, prospective, respective, respectable, respite, special,

Indeed to such an extent is the English language impregnated with Sanskrit and Hebrew, that we can scarcely utter a sentence which does contain one or more words derived from one or both of those languages. Professor Müller makes the Celtic a branch of what he designates the Aryan family. He says, "Celtic words may be found in German, Slavonic, and even in Latin, but only as foreign terms, and their amount is much smaller than is commonly supposed. A far larger number of Latin and German words have since found their way into the modern Celtic dialects, and these have frequently been mistaken by Celtic enthusiasts for original words, from which German and Latin might, in their turn, be derived." In these remarks I entirely coincide. It has indeed often occurred to my mind that the attempt of Celtic scholars to trace, by implication, the Latin, Greek, and other languages to the Celtic, is puerile in the extreme. After a comparison of the Celtic dialects with the Greek, Latin, and derivative languages, the Gotho-Teutonic languages, and the Sanskrit, my own impression is that one-half of the words now found in Gaelic, Erse, Manx, Welsh, Cornish and Bas Breton owe their origin to the modern European languages, and that two-thirds of the remaining moiety may be traced to Greek and Latin. With regard to the Celtic element in English, urged with so much assurance by some writers, I do not believe that in the whole body of the language there will be found thirty Celtic words; which is above the number that exists in Latin and Greek. On Ethnology, Professor Müller says, "The science of language and the science of ethnology have both suffered most seriously from being mixed up together. The classification of races and languages should be quite independent of each other. Races may change their languages, and history supplies us with several instances where one race adopted the language of another. Different languages therefore may be spoken by one race, or the same language may be spoken by different races; so that any attempt at squaring the classification of races and tongues must necessarily fail." This is quite true. Instance the French, a nation chiefly of Celtic origin, whose native tongue has been replaced by the Latin; for what is the French language of the present day but one in which sixteen out of every twenty words have been corrupted from Latin? Again, in Cornwall, the ancient language, a sister dialect of the Welsh, has

specialty, species, specific, specimen, specious, spectacles, spectator, spectrum, speculate, speculative, spices, spicy, spite, spiteful, spy, suspect, suspicious; and I may add, among others, despection, despicable, despise, disrespect, episcopal, inauspicious, retrospect, retrospective, and spectre.

been long since superseded by the English; whilst in the Highlands of Scotland, where are to be found some of the purest remains of the Celtic, the English language bids fair to become the national one. The fate of language, when spoken by those subjected to foreigners of another tongue, will be seen by the following extract from Niebuhr, "Many people living under the dominion of the Arabians and Turks have lost the use of their mother tongue. The Greeks and Armenians settled in Egypt and Syria, speak Arabic; and the services of their public worship are performed in two languages at once. In Natolia these nations speak their own languages in several different dialects. The Turkish officers sometimes extend their despotism to the language of their subjects. A Pacha of Kaysar, who could not endure to hear the Greek language spoken, forbade the Greeks in his pachalic, under pain of death, to use any language but the Turkish. Since that prohibition was issued, the Christians of Kaysar and Angora have continued to speak the Turkish, and at present do not well understand their original language." That some remains of another language may, however, survive the general wreck in different places, will be seen by the following passage from the same author. "In Syria and Palestine, indeed, no language is to be heard but the Arabic; and yet the Syriac is not absolutely a dead language, but is still spoken in several villages in the pachalic of Damascus. In many places, in the neighbourhood of Merdin and Mosul, the Christians still speak in the Chaldean language; and the inhabitants of the villages, who do not frequent towns, never hear any other than their mother tongue. The Christians born in the cities of Merdin and Mosul, although they speak Arabic, write in the Chaldean characters, just as the Maronites write their Arabic in Syriac letters, and the Greeks write their Turkish in Greek letters." *

A few words on the use of the terms Semitic, Japhetic, and Caucasian, still used by some authors. The descendants of Shem and Ham, the youngest sons of Noah, are said to have peopled all the great plain situated north and west of the Persian Gulf, between that Gulf and the Indian Ocean on the east, and the Arabian Gulf and the Mediterranean on the west, with the northern coast of Africa; comprehending Assyria, Chaldea, Syria, Palestine, Arabia, Egypt, and Lybia, and the principal languages and dialects used by these descendants, known to us under the name of Chaldee or Aramean, Syriac, Hebrew, old Phœnician, Arabic, Ethiopic, Samaritan, and Coptic

* See Niebuhr, vol. ii, p. 259, etc.; also Calmet, Dict. Bib., by Taylor. London: 1832.

have been accordingly styled Semitic or Shemitic. The descendants of Japhet, the eldest son of Noah, are said to have peopled Asia Minor, the northern parts of Asia, about the Euxine and Caspian, and all Europe; hence the term Japhetic has been applied to the languages spoken by these peoples, in contradistinction to Shemitic. The term Japhetic will, therefore, include not only the Celtic, German, and the Greek, Latin, and derivative languages, but likewise all Asiatic languages not comprised under the term Shemitic. We next come to the term Caucasian. The name Caucasus is applied to a chain of mountains in Asia, extending from the borders of the Euxine to the shores of the Caspian, through a space of about 400 miles, and forming an almost impassable barrier between Russia, Persia, and Turkey. Blumenbach* makes the tribes inhabiting this tract of country the basis of one of the five primary classes into which he divides the whole human race; and the term Caucasian has been also applied (in lieu of Japhetic) to the languages spoken by all races of Caucasian origin. The term Caucasian has been, to some extent, replaced by Indo-Germanic and Indo-European. Max Müller substitutes for the last two names, the technical term Aryan. Speaking of the sixteen countries mentioned in the *Zend-avesta*, he says, "The first of these countries is called *Airyanem Vaejô*, 'the Aryan seed,' and its position must have been as far east as the western slopes of the Belurtag and Mustag, near the sources of the Oxus and Yaxartes. From this country, which is called their seed, the Aryans advanced towards the south and west, and in the *Zend-avesta* the whole extent of country occupied by the Aryans is likewise called Airyâ. A line drawn from India along the Paropamisus and Caucasus Indicus in the east, following in the north the direction between the Oxus and Yaxartes, then remaining along the Caspian Sea, so as to include Hyrcania and Râgha, then turning south-east on the borders of Nisaea, Aria (*i.e.* Haria), and the countries washed by the Etymandrus and Arachotus, would indicate the general horizon of the Zoroastrian world. Greek geographers use the name of Ariana in a wider sense even than the *Zend-avesta*. All the country between the Indian Ocean in the south, and the Indus in the east, the Hindoo Kush and Paropamisus in the north, the Caspian gates, Karamania, and the mouth of the Persian gulf in the west, is included by Strabo (xv, 2.) under the name of Ariana; and Bactria is thus called by him 'the ornament of the whole of Ariana.'" I am inclined to think that the term Aryan will not be accepted as satisfactory, the area above given being peopled by nations

* De Generis Humani Varietate Nativâ Dissertatio.

whose languages can hardly be classed in the same family. I think it will be admitted that although Bengálí, Uríya, Maráthí, Hindí, Guzaráthí and Persian may be classed under the Aryan group; on the other hand, Karnáta, Telugu, Tamil, and Malayálam should be placed under what Professor Müller designates the Turanian family. The chapter on the Turanian family, and especially on the Turkish branch, will deserve a careful study. Max Müller derives the word Turanian from Tura (implying the swiftness of the horseman), the original name of the Turanians. He applies the term to the nomadic races of Asia, as opposed to the agricultural or Aryan races, and likewise to all languages spoken in Asia and Europe not included under the Aryan and Semitic families, except the Chinese and its cognate languages and dialects, as, for instance, the Japanese and Anamitic. The characteristic feature of the Turanian family is what has been termed agglutination or gluing together. "This means not only that, in their grammar, pronouns are *glued* to the verbs in order to form the conjugation, or prepositions to substantives in order to form declension. That would not be a distinguishing characteristic of the Turanian or Nomad languages; for in Hebrew as well as in Sanskrit, conjugation and declension were originally formed on the same principle. What distinguishes the Turanian languages is that in them the conjugation and declension can still be taken to pieces; and although the terminations have by no means always retained their significative power as independent words, they are felt as modificatory syllables and as distinct from the roots to which they are appended. In the Aryan languages the modifications of words, comprised under declension and conjugation, were likewise originally expressed by agglutination; but the component parts began soon to coalesce, so as to form one integral word, liable in its turn to phonetic corruption to such an extent that it became impossible after a time to decide which was the root, and which the modificatory element. The difference between an Aryan and a Turanian language is somewhat the same as between good and bad mosaic. The Aryan words seem made of one piece; the Turanian words clearly show the sutures and fissures where the small stones are cemented together." As an instance of this agglutination, Professor Müller takes the Turkish verb *sevmek*, "to love," in its present tense, the root of which is *sev*, the termination *mek* or *mak* being merely used to form infinitives. "The root *sev*, to love, in the most general sense of the word, or love as a root, but expressing only the general idea of loving in the abstract, but which root can never be touched. Whatever syllables may be added for the modification of its

meaning, it must never be changed or broken, assimilated, or modified, as in the English I fall, I *fell*, I take, I *took*, I think, I *thought*, and similar forms. In Turkish, one participle is formed by adding *er* : thus *sever* will mean lov-er or lov-ing. We now get *sever* as forming the first two syllables of the verb in all its inflections in the present." The Turkish pronouns are *ben*, I; *sen*, thou; *ól* or *ó*, he; *biz*, we; *siz*, you; *ânlar*, they. The present of the indicative is: *sev-er-im*, I love; *sever-er-sen*, thou lovest; *sev-er*, he loves; *sev-er-iz*, we love; *sev-er-siz*, you love; *sev-er-ler*, they love. From this it will be seen that in the second person singular and plural the pronoun is preserved intact; in the first person singular it takes the form of *im;* in the third person it is dropped altogether; in the first person plural *biz* becomes *iz*, whilst in the third person plural, *ânlar* is corrupted down to *ler*;* but that notwithstanding this the root *sev* is always preserved. It may be here observed that agglutinative languages are not peculiar to Asia, nor to written languages. The Hottentot family of languages, and some of the American Indian languages, are exceedingly rich in words formed by agglutination. Professor Müller has little faith in the onomatopoetic and interjectional theories (which he respectively designates the *Bow-wow theory*, and the *Pooh-pooh theory*), the former of which was at first defended by Herder† and the latter by Condillac and others. He says, "Though there are names in every language formed by imitation of sound, yet these constitute a very small proportion of our dictionary. They are playthings, not the tools of language, and any attempt to reduce the most common and necessary words to imitative sounds ends in complete failure." . . . . . "We cannot deny the possibility that *a* language might be formed on the principle of imitation: all we say is, that as yet no language has been discovered that was so formed. An Englishman in China, seeing a dish placed before him about which he felt suspicious, and wishing to know whether it was a duck, said, with an interrogative accent, "Quack, quack?" He received the clear and straightforward answer "Bow-wow!" This no doubt was as good as the most eloquent conversation on the same subject between an Englishman and a French waiter; but I doubt whether it deserves the name of language. We do not speak of a *bow-wow*, but of a dog. We speak of a cow, not of a *mow;* of a lamb, not of a *baa*. It is the same in more

* The defective verb *im*, I am, comes even nearer to the termination of the present of the indicative. It runs thus, *im*, *im*, or *in*, I am; *sen*, thou art; *dur*, he is; *iz* or *iz*, we are; *siz* or *siñiz*, you are; *durler*, *lerdur*, or *ânlardur*, they are.

† Cf. Steinthal's Der Ursprung der Sprache, Berlin, 1858.

ancient languages, such as Greek, Latin, and Sanskrit. If this principle of onomatopeia is applicable anywhere, it would be in the formation of the names of animals; yet we listen in vain for any similarity between goose and cackling, duck and quacking, sparrow and chirping, hog and grunting, cat and mewing, between dog and barking, yelping, snarling, or growling. There are of course some names, such as *cuckoo*,* which are clearly formed by an imitation of sound. But words of this kind are, like artificial flowers, without a root. They are sterile, and are unfit to express any thing beyond the one object which they imitate. If you remember the variety of derivatives that could be formed from the root *spac*, to see, you will at once perceive the difference between the fabrication of such a word as *cuckoo*, and the true natural growth of words." . . . . . "Most of these onomatopeias vanish as soon as we trace our own names back to Anglo-Saxon and Gothic, or compare them with their cognates in Greek, Latin, or Sanskrit. The number of names which are really formed by an imitation of sound dwindle down to a very small quotum if cross-examined by the comparative philologist; and we are left in the end with the conviction that though a language might have been made of the roaring, fizzing, hissing, twittering, cracking, banging, stammering, and rattling sounds of nature, the tongues with which we are acquainted point to a different origin. I am inclined to think Professor Müller has greatly underrated the onomatopoetic theory, and that all languages have derived a great many words in this way. If the English language be taken as a sample, the words derived (directly or indirectly) by imitation of sound will be found to form a large proportion of the words from which the whole language has been built up. I give the following list, which might be added to very considerably. Thus, bang, bark, baste, batter (to), bawl, bay, beat, beef,† blare, blast, blaze, bleat, blow, boil, bomb, bovine, bray, broil, brush, bubble, bucolic, bump, burn, burst, buss, buzz, cackle, cat (to), caw, chatter, chew, chirp, chough, clip, cluck, coo, cook, cough, crack, crake,‡ crash and crush, creak, croak, crow, cuckoo, cut, daddy, dash, din, dip, drain, dribble, drill, drink,§ drub, drum, echo, father,‖ fire (to), fizz and fizzle, flap, flash, flicker, flitter, flutter, fly, gabber, gargle, gash, giggle, gnash, gnaw, gobble, grill, grind, groan, growl, grunt, gulp, gurgle, gush, hammer, hiccoop,

* Cf. crake, crow, rail.

† Evidently from *βοος*, *βους*, from the sound made by the animal. *Boos*, *bos*, *bovis*, bœuf, beef. Cf. bovine, bucolic.

‡ The bird so named.

§ From the trinking of the glasses whilst toasting each other.

‖ Indirectly.

hiss, hist, hoop or whoop, howl, hush, jerk, jump, knock, laughter, lick, low (to), lump, mamma, mash, mew, mewl and miaul, moan, mother,* mumble, murmur, mutter, neigh, palpitate, pant, papa, pat, paternal,* patter, peal (to), piddle, pewit, pour, puff, pump, push, quack, quash or squash, rail,† rain, rap, rend, ring, rinse, ripple, roar, roll (to), rub, ruffle, rumble, rush, saw, scrape, scream, seethe, shears, shoot, shout, shuffle, shut, sick, sigh, simmer, sing, skim, slam, slap, slash, slide, slip, slit, smack, smash, snarl, sneeze, snivel, snore, snort, sob, sound, spatter, spew, spill, spit, splash, split, sputter, squall, squeak, squeeze, squirt, stammer, stamp, strike, stutter, stun, surge, tear (to), thrash, throb, thump, tick and ticket, titter, tone, tramp, trickle, tug, tuck, tush, twaddle, twitter, whack, whap or whop, whine, whip, whirl, world, whisper, whiz, yelp.‡

I agree in the main with Professor Müller's etymologies; but must take the liberty of excepting to some of them, as of the words *Erin, Welsh, feeble, friend, soul, sea.* I shall, however, for want of space, be compelled, for the present, to postpone what I have to say upon this subject. Professor Müller is of opinion that grammar is the criterion of language. He says, "Hervas was told by missionaries that in the middle of the eighteenth century the Araucans used hardly a word which was not Spanish, though they preserved both the grammar and the syntax of their own native speech. This is the reason why grammar is made the criterion of the relationship and the base of the classification in almost all languages; and it follows, therefore, as a matter of course, that in the classification and in the science of language, it is impossible to admit the existence of a mixed idiom." . . . . "It is as impossible to derive Latin from Greek, or Greek from Sanskrit, as it is to treat French as a modification of Provençal. The same auxiliary verb can be made to furnish sufficient proof that Latin never could have passed through the Greek, or what used to be called the Pelasgic stage; but that both are independent modifications of the same original language." Again, "the only remark which the comparative philologist has to make is, that the idea of making Greek the parent of Latin is more preposterous than deriving English from German; the fact being that there are many forms in Latin more primitive than their corresponding forms in Greek." No doubt, if grammar is to be considered as the only criterion of language, that the Latin could hardly have been derived from the Greek; at the same time, if both these languages are compared with the Sanskrit—and for this purpose we need

* Indirectly. † The bird so named.

‡ See also Dictionnaire raisonné des onomatopées, par Ch. Nodier, 2nd ed. 1828.

only compare the present tense of the verb "to be", the crude form of which is *as* or *es*, with the Greek, Latin, old Slavonic, and Gothic —there can be little doubt that the grammar of each has been derived from the Sanskrit. There are, doubtless, some forms in Latin more primitive than their corresponding forms in Greek, and others which come nearer to the Sanskrit than do the Greek; nevertheless, it cannot be denied that the Latin is indebted to the Greek for very many words. We must not be guided by a cursory glance at our Latin dictionaries, containing at least 40,000 words, in order to arrive at a proper conclusion with regard to the number of words which the Latin has borrowed from the Greek. If these are carefully examined, it will be evident that the Latin language has been built up from a very few words indeed. Mr. Hall* reduced it to 1,321 root words; but even many of these will be found to be compounds, and may probably be brought down to 900 or 1000; and I do not hesitate to assert, notwithstanding all that has been stated by some able philologists to the contrary, that more than one-half of these have been derived from the Greek.†

One of the most interesting chapters of the work is that on the origin of grammatical forms. It has hitherto seemed to most minds that any attempt to discover the origin of the different inflections would prove hopeless. To be sure, Bellot and others have endeavoured to account for some terminations, but with little success. Professor Müller has led the way to the discovery of this very curious riddle in the science of language. For instance, he considers the termination *bo* in *amabo* is the old auxiliary *bhû*, to become (a word, by the by, from Sanscrit, *bhu*, to be), and that *σω* as the termination of the Greek future, is the old auxiliary, *as*, to be (the final letter being, of course, the only etymological part of the word). Again, he shows clearly that the final letter in the preterite *loved* is the auxiliary verb *to do*, and that I *loved* is the same as I *love did*, or I *did love*. This he proves by a comparison with the Gothic and Anglo-Saxon. Thus the preterite singular of the Gothic *nasjan*, to flourish, which is *nas-i-da*, *nas-i-dês*, *nas-i-da*, becomes, in Anglo-Saxon *ner-ë-de*, *ner-ë-dest*, *ner-ë-de*. The auxiliary verb *to do*, in Anglo-Saxon, is in the singular *dide*, *didest*, *dide*. If, says he, we had only the Anglo-Saxon

* Principal Roots of the Latin Language. London: 1825.

Root substantives - - - - -	657
„ adjectives - - - - -	252
„ verbs - - - - -	412
	1321

† In order not to exceed the required limits, the vocabulary of these words has been reluctantly omitted. It shall, however, be given in some future paper.

preterite *nerëde*, and the Anglo-Saxon *dide*, the identity of the *de* in *nerëde* with *dide* would not be very apparent. In the Gothic singular *nasida, nasidês, nasida* stand for *nasideda, nasidedês, nasideda.* The same contraction has taken place in Anglo-Saxon, not only in the singular, but in the plural; yet such is the similarity between Gothic and Anglo-Saxon, that we cannot doubt that their preterites have been formed on the same last; and if there is any truth in inductive reasoning, there must have been an original Anglo-Saxon preterite *ner-ë-dide, ner-ë-didest, ner-ë-dide;* and as *ner-ë-dide* dwindled down to *nerëde*, so *nerëde* would, in modern English, become *nered*, and therefore the *d* of the preterite I *loved* was originally the auxiliary verb to *do*. Further, "it might be asked, however, very properly, how *did* itself, or the Anglo-Saxon *dide*, was formed, and how it received the meaning of a preterite? In *dide* the final *de* is not termination, but it is the root, and the first syllable *di* is a reduplication of the root; the fact being that all preterites of old, or, as they are called, strong verbs, were formed, as in Greek and Sanskrit, by means of reduplication; reduplication being one of the principal means by which roots were invested with a verbal character. The root *do*, in Anglo-Saxon, is the same as the root *θη* in *τιθημι*, and the Sanskrit *dhâ* in *dadhâmi*. Anglo-Saxon *dide* would, therefore, correspond to Sanskrit *dahhau*, I placed." Further, he shows that the Romance future was formed on a totally different principle to the Latin future in *bo*, the former being originally a compound of the auxiliary verb to *have*, with an infinitive; and that in French I *have to say (je-dir-ai)*, easily took the meaning, I *shall say*. Again, Professor Müller proves that the final syllable *bam* in *catabam* (whence *ba* in Spanish *cantaba*, and *va* in Italian *cantava*), was originally an independent auxiliary verb, the same which exists in Sanskrit *bhavâmi*, and in Anglo-Saxon *beom*, I am. He also accounts for adjectival forms; but the subject, although exceedingly interesting, is not within our present limits.

In the chapter on "Dialectic Regeneration" Professor Müller says, "Dialects have always been the feeders rather than the channels of a literary language; anyhow, they are parallel streams which existed long before one of them was raised to that temporary eminence which is the result of literary cultivation. . . . . Before there is a national language, there have always been hundreds of dialects in districts, towns, villages, clans, and families.* That a language may

* Those who assert that languages were originally formed from dialects, go far to disprove the common origin of languages.

be made up of many others we need only name the English, which although principally based upon Latin and Saxon, is a mélange of upwards of fifty languages. That a dialect, and even a branch of a dialect, may itself become a language, is proved by the different dialects of the Greek, as the Eolic, Doric, Attic, and Ionic, which in later times were justly entitled to the appellation of languages. Again, the Polish and Russian, which, although at first merely dialects of the Slavonic, are now entitled to rank as languages. On the other hand, it would be absurd to say that the most ancient languages had their origin in dialects. It is quite the reverse. What is the meaning of the word dialect? A dialect is "the branch of a parent language, with such alterations as time, accident, and local alterations have occasioned." Dialect is indeed to the principal language what variety is to species. Grimm* says "Dialects develope themselves progressively, and the more we look backward in the history of language the smaller is their number, the less definite are their features. All multiplicity arises gradually from an original unity." On the other hand, Max Müller tells us that the progress of civilization and centralization tends to reduce the number of dialects, and to soften their features. This is strengthened by some facts which Professor Müller himself gives incidentally. He says, "We are told by Pliny that in Colchis there were more than three hundred tribes speaking different dialects; and that the Romans, in order to carry on any intercourse with the natives, had to employ one hundred aud thirty interpreters. This is probably an exaggeration, but we have no reason to doubt the statement of Strabo, who speaks of seventy tribes living together in that country which, even now, is called 'the mountain of languages.'" Whatever may have been the tendency in the early ages of the world, there can be no doubt that in modern times dialects have not increased in number, but rather the reverse. The greater the intercommunication between the peoples of the earth the fewer will be the number of dialects. Dialects of neighbouring peoples will coalesce, whilst dialects in general will give place to the more polished language.†

Professor Müller gives some account of the principal European languages, but says nothing in relation to the Basque; and perhaps I

* Geschichte der Deutschen Sprache, s. 833; Max Müller, p. 51.

† There never has existed a country so vast, and a population so large as that of the United States, with so little variety of dialect, which is owing to the quick and constant communication between the different parts of the country, and the roving spirit of the people, the great mass of whom, besides, derive their descent from the same stock.—*Encyc. Amer.* (Lieber); Phil., 1830, in voc. "Dialect."

have scarcely room here to enter much on the subject. In addition to what I have already said, I will simply remark, first, that the Basque cannot be classed among the Celtic languages, and that it contains very few Celtic roots; secondly, that if compared with the Finnish, Lapponic, Hungarian, and Georgian languages, it will be found to belong to the Tatar family; thirdly, that it has no words direct from the Sanskrit; and that any Sanskrit roots that it possesses have crept in through the Greek, Latin, or derivative languages; fourthly, that it has one affinity with the Scandinavian languages, in the postponement of the definite article; and fifthly and lastly, that, if compared with the Greek and Latin, it will be found to have borrowed a very large number of words from those languages.*

And now with regard to the common origin of languages. Grotius is of opinion that though the primitive language of mankind nowhere exists in its original form, that nevertheless traces of it may be found in all the languages now spoken; a bold assertion for any one to make; for what linguist ever did or ever could compare all the languages of the globe, so as to have the means of ascertaining whether they contain traces of a primitive idiom. Professor Müller argues only for the *possibility*, not for the *probability*, of a common origin. He says nothing necessitates the admission of different independent beginnings for the *material* and *formal* elements of the Turanian, Semitic, and Aryan branches of speech; and that it is possible even now to point out radicals which, under various changes and disguises, have been current in these three branches ever since their first separation. In reference to this, I would ask when the separation (if any) took place, and what evidence we possess on the subject? It would seem that the mention of the word "separation" in this place is assuming the whole question. I would ask, moreover, what are the radicals in the three branches of language which have been current since such separation: and is it not more than probable that they are accidental? Professor Müller admits that it is impossible to derive the Aryan system of grammar from the Semitic, or *vice versâ;* yet he perfectly understands how, either through individual influences, or by the wear and tear of speech in its own continuous working, the different systems of Asia and Europe

* Azaïs derives the Basque from the Hebrew, through the Carthaginian, Phœnician, and Syriac! Dr. Webster says the Basque or Cantabrian in Spain, the Gaelic in the north of Scotland, and the Hiberno-Celtic, or native language of Ireland, are the purest remains of the ancient Celtic! This only shows that Dr. Webster cannot have looked into the Basque. If he had done so, it may be doubted whether he would have been able to discover twelve Celtic words.

may have been produced. I cannot see it myself. The differences between these three branches, and between them and other languages, have continued so long that we can hardly suppose them to have had a common origin. Let us take, for example, two of the most ancient languages, the Chinese and the Sanskrit. These two languages, or as the latter is not now spoken, the languages derived therefrom, have been proved to have existed at least 4000 years; the one monosyllabic and atactic, the other polysyllabic and syntactic.* It does not appear that during this period they have at all approached nearer to each other, and, in their general structure and character they remain the same; and if such be the case, are we to assume that prior to the time to which we are enabled to trace them, language could have undergone so many changes in its organic structure as to have produced the different systems of Asia and Europe. But if we are to take the vulgar theory of the age of the world—say 6000 years—to be the correct one, the thing is still more improbable; for if there has been no material change in these two languages during the last 4000 years, on what ground are we to presume that some violent change should have taken place within the previous 2000 years. The same remarks might be made on other languages, as the Hebrew and kindred languages; the Basque, the Greek, and the Slavonic languages. The Tatar conquest made no alteration in the structure of the Chinese idiom; nor has the Basque lost its grammatical forms, notwithstanding that the people of this part of Spain have been for ages surrounded by nations speaking languages whose idioms are entirely opposite.†

Max Müller makes no mention of the African and American languages, or the Polynesian and Australian dialects, which, we shall hereafter see, amount in number to nearly all the languages of the globe put together. All these languages and dialects are more or less ancient, and some of them may be traced, it is said, as far back

* It is a remarkable fact that in Japan two languages exist at the same time; the one monosyllabic and atactic, like the Chinese; the other polysyllabic, with numerous inflexions and grammatical forms. The former is called the *Koye*; the latter the *Yomi*. Both are in use at the same time, and occasionally intermix with each other, still preserving their general character and peculiar structure. See Elémens de la Grammaire Japonaise, par le P. Rodriguez, traduits du Portugais, par M. C. Landusse, Paris, 1825; and Encyc. Amer. (Lieber); Phil., 1832, in voc. "Philology".

† Cf. Partington, Brit. Cyc. Between the Chinese and the Cherokee it would be difficult to find the least etymological affinity; and if the distance of places is assigned as the cause, we will instance the Bengáli, a language spoken in a country not far from China, and which differs from the Chinese full as much as Mohawk from Potawotamee; *ib.*

as the Chinese and Sanskrit; and yet their organic differences have remained the same for ages. We find in them idioms of different structure, having characters of their own, of which it would be in vain to seek for traces in a primitive tongue.* Independently, however, of grammar, a comparison of words should be made. That the European and Asiatic languages have many words in common there can be no doubt. On the other hand, some of the most ordinary words are totally dissimilar in very many languages; and I am disposed to think, that taking into account phonetic decay, wear and tear of words, and other causes, there remains scarcely any possibility of their having had a common origin. I will merely give a few of such words, reserving for a future paper to extend the list. The word *gold*, which in the Gotho-Teutonic languages is found written *gull*, *guld*, and *goud*, and in the Tatar *goltz*, can have no etymological connection with Latin *aurum* (whence Spanish and Italian *oro*, French *or*, Gaelic *òir*); nor with Polish *zloto*, Greek χρυσεος, Sanskit *kănăkă*, Arabic *zahab*, Persian *zur* and *tilá*, Hindústání and Bengali *soná*, Turkish *altún*, Malay *amas* or *mas*, Quichua *cúri*, Bugis *ulawöng*, Egyptian *νουβ*, Anamitic *vàng*, Chinese *kin*, Malagasy *volamena*. Compare English *moon*, Latin *luna*, Greek σεληνη, Persian *parú*, Turkish *âï*, Sanskrit *chandra;* English water (Greek *υδωρ*), Latin *aqua*, Malagasy *mandena*, Birmese *re*, Mandchu *mouke*, Bugis *uwae* (Oceanic *vai*), Tonquinese *nou-di*, Chinese *shŭhy;* English *sea*, Arabic *bahr*, Turkish *dengiz*, Sandwichian *kai*, English *house*, Greek οικος, Mandchu *po*, Arabic *bait* (Hebrew *beth*), Marquisian *hae*, *fae*, Chinese *ŭh*, *fang ŭh*, *kea*, *chou kea*, Turkish *av*, Bugis *bolah*, Hindústání *ghar;* English mountain (Latin *mons*), German *berg*, Greek ορος, Turkish *tágh*, Pushto *ghar*, Quichua *urcu;* English *bread*, Latin *panis*, Finnish *leipä*, Malay *róti* Chinese *mëen tow*, *mëen paou*, Javanese *redjekki*, Japanese *moci*, Armenian *zhats*, Georgian *puri*, Coptic *oik*, Ethiopic *sifai*, Chilian *cobque*, Mexican *remiou*.

I will conclude with a few remarks upon the statistics of language. Francesco Lopez, a native of South America, who had extensive knowledge of both continents, thought it no rash statement to make, that the idioms, *notabilmente diversi*, of both Americas amounted to at least 1,500.† The Abbé Rozo says that the inhabitants of the two Americas spoke not less than 2,000 languages. Father Kircher informs us that American missionaries make the South American languages amount to 500; while the Abbé Clavigero had cognizance

* Partington, Cyc. † See Hervas, Cat. Ling., p. 11.

of 35 idioms spoken in Mexico. The *Imperial Dictionary*,* compiled at the instance of the Empress Catherine, which was published in the year 1787, contains a list of 285 words, translated into 51 European, and 149 Asiatic languages. A second edition of this work, in which the words are arranged alphabetically, appeared in 1790-91, in 4 vols., edited by Jankiewitsch de Miriemo. This edition contains, according to some, 279 languages; 171 for Asia, 55 for Europe, 30 for Africa, and 23 for America.† The authors of the *Mithridates* increased the number of known languages and dialects to 2,000; which Friedrich Adelung‡ augmented to 3,066, geographically distributed as follows:—

Asiatic - - -	987
European - - -	587
African - - -	276
American - - -	1,214
	3,064§

The numbers of those who speak the different languages made use of in America are thus distributed. English, 11,647,000; Spanish, 10,174,000; Portuguese, 3,740,000; Indian, 7,593,000; French, 1,242,000; Dutch, Danish, Swedish, and Russian, 216,000.‖

With respect to the number of words contained in some of the principal languages, in the following, I can only give the approximate number. The Arabic contains about 150,000; the Hindústání, 18,000; the Sanskrit, 27,000; the Malay, 13,000;¶ the Puk'hto or Pus'hto, 22,000;** the Egyptian, 4,000; the Armenian, 30,000; the Turkish, 50,000; the Mandchu, 16,000; the Latin,

* Glossarium Comparativum Linguarum totius Orbis. Petersb., 1787.

† According to Pott (Ungleichheit, p. 230), it contains 277 languages; 185 for Asia, 22 for Europe, 28 for Africa, 15 for America. This would make 280. Max Müller. [It would rather add up 250. R. S. C.]

‡ Übersicht aller bekannten Sprachen und ihrer Dialekte, von Friedrich Adelung, 8vo, pp. xiv-186. St. Petersb., 1820.

§ About twenty of the Italian dialects have been reduced to writing, and made known to the press. The dialects of France are almost as numerous as her provinces. Languedoc alone has seven or eight distinct dialects.—Champollion-Figeac reckons the most distinguishable dialects of France at fourteen. The number of modern Greek dialects is carried by some as high as seventy. (Cf. Marsh, p. 678; Sir John Stoddart's Glossology, s. 31, and p. 29 and 33.) The principal British dialects are those of Norfolk and Suffolk, Kent, Durham, Gloucestershire, Essex, Yorkshire, Worcestershire, Herefordshire, Dorset, Sussex, Devonshire, Warwickshire, Cornwall, Derbyshire, Westmoreland, Cumberland, Sheffield, Shropshire, Lancashire, Somersetshire, Cheshire, Northumberland, Craven, and the Scottish dialect.

‖ Encyc. Amer. (Lieber); Phil., 1829.

¶ Marsden's Dictionary gives about 6,000; Crawfurd's about 13,000; which includes many proper names.

** Larramendi, in his day, gave the number at 13,365 only.

40,000; the mediæval Latin, 100,000; the Greek, 89,000; the Spanish, 25,000; the Italian, 50,000; the French, 42,000; the Gaelic, 23,000; the Irish, 50,000; the Welsh, 40,000; the Russian, 40,000; the Polish, 24,000; the Anglo-Saxon, 25,000. Flügel, in 1843, estimated the number of German words in his own dictionary at 94,464, of which 65,085 were simple, 29,379 compound. Thommerel gave the number of words in the English dictionaries of Robertson and Webster as 43,566, 29,853 of which he derives from Classical, 13,230 from Teutonic (Anglo-Saxon), and the rest from miscellaneous sources. Todd's edition of Johnson, however, is said to contain 58,000 words, and the later editions of Webster, which contain the particles of the present and perfect, have reached 70,000;* but, if every word were included, the number would probably now exceed 80,000. The Hebrew words in the Old Testament amount to 5,643. The Hindí has exactly 6,000 words;† the languages of the Marquesas and the Sandwich Islands, 6,123; the Provençal, 107,201. The cuneiform inscriptions of Persia contain no more than 379 words, of which 131 are proper names. The vocabulary of the ancient sages of Egypt, as far as it is known to us from the hieroglyphic inscriptions (as given by Bunsen), amounts to about 658 words. The number of hieroglyphic groups in Sharpe's *Egyptian Hieroglyphics* (1861), amounted to 2,030. There are about 450 radicals or sounds in the Chinese language, which by various accents and intonations are raised to 1,263.‡ Mr. Crawfurd§ says an examination of 4,074 radical words of the dictionary shows that the Malay language is composed of the following lingual elements:—Native Malay words, 2,003; common to the Malay and Javanese, 1,040; Sanskrit, 199; Telinga, 23; Arabic, 160; Persian, 30; Portuguese, 19. He says, further, an examination of the Malay, including its foreign elements, shows that, out of 1,000 words, 285 are common to it and the Javanese; and a similar

* Cf. Marsh's Lectures, p. 182; and Max Müller, p. 271.

† Cf. Dr. Hunter's Hindústání Dictionary.

‡ The exact number of words contained in the Imperial Dictionary of Khanghi amounts to 42,718. About one-fourth part has become obsolete, and one-half of the rest may be considered of rare occurrence, thus leaving only about 15,000 words in actual use. The number of the classical characters is 42,718, but many of them are no longer in use in the modern language. (Stanislas Julien.) Cf. Müller.

§ Grammar and Dictionary of the Malay Language, by John Crawfurd, F.R.S. 8vo, London, 1852. At vol. i, p. 73, speaking of the whole body of the language, he says it contains 516 words from the Sanskrit; 750 from the Arabic; 95 from the Persian; 40 from Tâlugu or Telinga; and 37 from Portuguese. He says, further, that the earliest example of Malay is the Vocabulary of Pigafetta, in 1521, which contains 344 words only, 270 of which can be readily ascertained to be the same language as that spoken at the present day.

one of the Javanese, that 240 out of 1,000 are common to it and the Malay; and that of the Malay 715 parts, and of the Javanese 760, appear to be native.

Professor Müller tells us that Sanskrit grammarians have reduced the whole growth of their language to 1,706 roots;* but he is of opinion that the primitive sounds expressive of different meanings requisite for the etymological analysis of the whole Sanskrit dictionary would not amount to one-third of that number, and he doubts whether they may not be reduced even to 500 words; that Renan† has reduced the Hebrew to about the same number; and that Benloew‡ estimates the necessary radicals of Gothic at 600, and of modern German at 250. The Latin primitives contained in the Index Etymologicus of Gesner's *Thesaurus*, amount to 2,400;§ but, as I have before said, they may be reduced to some 900 or 1,000 words. The Greek primitives given by MM. Port Royal amount to 2,200, but might, perhaps, be reduced to about 1,200.

The following tabular form gives the proportions of vowels and consonants in some of the principal languages.¶

	Cons.	Vowels.	
Sandwich Islands	1	1·8	
Greek { Ionic dial.	1	1·333	
Greek { Attic dial.	1	1·006	
Portuguese	1·02	1	
Common Arabic	1·08	1*	
Italian	1·1	1	
Seneca Indians	1·18	1	
Chahta Indians	1·2	1	
Sanskrit	1·2	1*	
Latin	1·2	1	
Hebrew	1·2	1*	
Spanish	1·24	1	
Persian	1·33	1*	
Malay	1·33	1	
French, phonic prop.	1·34	1	orthographic 1·27 : 1
Dutch	1·5	1	
English, phonic prop.	1·51	1	orthographic 1·52 : 1
Swedish	1·64	1	
German, phonic prop.	1·7	1	orthographic 1·64 : 1

* Benfey, Grammatik, § 147. † Histoire des Langues sémitiques, p. 138.
‡ P. 22. § See Vans Kennedy. ‖ Ibid.
¶ See Encyc. Amer. (Lieber), Phil.; 1830, in voc. "Consonants". Those marked with * are counted phonically.

THE INFLUENCE OF RACE ON ART.*

THE relationship of race to art is part of a larger subject, the connection of organization with mental manifestations, a great problem, involving in its profounder bearings some of the most important questions which can be submitted to our investigation. As a sphere of almost untried inquiry it opens up to us vast realms of possibility, in which the discoveries of exact science have yet to supersede the vague and unsatisfactory hypothesis of ill-informed speculation. In truth it is a province of vast extent, and with manifold subdivisions. Descending on one side to the minute specialties of individual development, as expounded by the phrenologists, it ascends on the other to the effect of racial type on national character. Nor does it stop here. For if organization be a reliable index of mental power, then are we enabled, through its aid, to pass beyond the limits of our own especial form of being, and, guided by their structure, proceed to admeasure the qualities and capabilities of the various genera, orders, and classes which compose the manifold gradations of the animal kingdom. Indeed till this has been accomplished comparative anatomy will be imperfect, and lack its crowning glory, as a revealer of beauty and harmony—not only in the organic, but also in the mental sphere as correlated to it. Without, however, at present entering into this department of the subject, which would indeed ultimately lead us up into the metaphysical region of abstract thought, where mind and matter, God and nature, constitute the subject of debate, we shall not perhaps be thought to unduly transcend the appropriate limits of this journal by a few remarks on racial type and mental power.

The venerable controversy respecting the effects of nature and education seems to be of almost world-old antiquity, and men, according to their several proclivities, have arranged themselves on the one side or the other, and probably on each have carried their respective views to excess. The savans, perhaps, exaggerating the importance of natural endowment, have somewhat undervalued the influence of

* History of Modern Architecture; with an Appendix on Ethnology from an Architectural Point of View. By James Fergusson. London: John Murray, 1862. 12mo, pp. 538.

circumstances, while the scholars altogether overestimating the force of circumstances have practically ignored the existence of inherent powers and disqualifications. And thus it has come to pass that history is what we find it, for the bookmen have hitherto possessed the monopoly of its composition, and have accordingly converted it into a chronicle of events, whereto the actors are regarded as quite subordinate accessories. Many signs, however, indicate that the days of this pleasant pedantry are ended, and that the time has come for looking the facts of race fairly in the face. Indeed the very revolutions and wars with which we are cotemporary, bring the question of hereditary type and character so forcibly into view, that not only are able editors becoming smartly ethnological in their leaders, but venerable statesmen and astute diplomatists are beginning to admit that the decisions of cabinets are not the sole influences which modify the destiny of nations. And, accordingly, in addition to their own sage opinion as to the fitness of things from the court standpoint, are prepared to regard racial tendency as one of the active and influential forces in the political scheme. Nor can this idea fail to grow, for it is supported by the whole past and the entire present of our race. Whether we regard the grander divisions or the minor varieties of man, it is found that type has combined with circumstances to modify civilization, and give it a character not simply geographical, but also racial. Thus no one at all acquainted with history and antiquities would expect the devout Semites to exhibit characteristics identical with those of the intellectual Aryans; nor will any one familiar with the latter attempt to confound them with their religious converts, the Tamul peoples of the south. It is the same in Europe, where the ancient classic type stands broadly distinguished from Sclavon or Teuton, as both of these, in an almost equal degree, are separated from the Celt. Nor are these distinctions perceived only by professed Ethnologists; they are equally seen and acted on by practical men, by the merchant in his adventures, the sailor in his voyages, and the soldier in his wars; and are indeed as well known to the simplest private as to his superior officers. Nay, it is practical men, not theorizing anthropologists, who are prone to carry out these distinctions into the rather stern and tyrannical result of caste, as we see wherever the negro and Caucasian, under whatever nominal relationship, actually meet face to face on the great highways of life. Nor can this be otherwise; for as diversity of race is a fact in nature, it will force an acknowledgment of its existence, whether from the most careless or most prejudiced,

provided they are only placed in circumstances where it is impossible to ignore the evidence of its presence. Neither were these ethnic differences first discovered in modern times; they were almost as familiar to the ancients, in so far as their knowledge extended, as to ourselves, and are at the present moment quite as much insisted on by barbarous tribes as by civilized nations.

It is not indeed the discovery, but the ignoring, of ethnic diversities which may be regarded as a modern invention. Antiquity never thought of confounding the races of men, and heathendom has never attempted it. They had no motive, their scheme of mythology did not require, and their social arrangements did not demand it. They did not believe, as a matter of faith, that all mankind were of one race; nor did they profess to enforce by law or sanction by custom a nominal equality, based on a real diversity. We in these latter times have been the victims of theory, in both respects; for we have fancied ourselves theologically bound by our creed to the profession of a racial unity, and by our social customs to the maintenance of an equality. It being apparently forgotten by all parties, theologians and socialists alike, that nature's scheme of being is not a democracy but a hierarchy, whose various grades are all distinctly marked and duly subordinated. An arrangement, commencing with suns and their systems, and descending to the minutest genera of organic existence, and which might, therefore, be legitimately expected in that grandest of nature's organic spheres, the races of man.

Perhaps another reason for the popular confusion of ideas on the subject of race now prevalent, is the fact that merely literary men seem to think themselves quite competent, if not to write works expressly on the subject, at least to review them, and pronounce flippant criticisms *ex cathedrâ* on topics of which they are about as well informed as of the effects of tangential and radial force, or any other of the more recondite departments of astronomy, which they would very properly leave to the professors of that especial province of inquiry. With the progress of anthropological science, however, this absurdity cannot fail to be ultimately corrected; but in the interval the conductors of our periodical literature do not seem to feel that there is the least necessity for placing ethnological works in the hands of duly qualified persons—if indeed such could be readily found. And the result is what we see, the great questions of racial origin, interaction, and relationship treated almost wholly from the theological and scholarly standpoint, biblical texts and philological affinities being employed with childlike confidence to settle disputes

which the profoundest study of mental characteristics and organic type has still left uncertain. All this, however, is but an inevitable accompaniment of the imperfect development of ethnology itself, which has yet scarcely vindicated its claim to be regarded as a science in general estimation.

With a full recognition of the reality of race, however, must come a proportionately frank admission of its importance. Once grant inherent diversity of endowment, and the inevitable result of this, in proportionate diversity of manifestation, cannot fail to follow as an unavoidable corollary, from which there is no escape. And to this, slowly yet surely, reluctantly yet under the resistless compulsion of fact and logic, the collective mind of civilization is determinately marching. It is, indeed, a bourne at which all duly qualified thinkers have already arrived, and the ultimate conversion of the lettered million is now merely a question of time. Within ethnological circles, indeed, the right to treat religious, political, literary, and artistic questions racially is unchallenged, the only opposition to such a procedure being from outsiders, whose antiquated prejudices may be very respectfully yet very decidedly ignored. That every distinctly marked type of humanity tends to develope its own creed and code, its peculiar faith and institutions, its specially characterized modes of thought and forms of beauty, is now denied by none but those whose opinions on such a subject are justly devoid of importance. For few things are more thoroughly insignificant than the decisions of ignorance blindly echoing the traditional errors of an outworn past, in a vain endeavour to control the direction and limit the range of modern thought by the senile voice of ancient authority.

Any attempt at a full definition of all the effects of race would yet, however, be premature. We want more reliable data than any that are yet in our possession, for the successful achievement of so great a design, for the effective realization of so grand an idea, to which, therefore, we can only make a remote and tentative approach, which, if it land us anywhere nearer the goal must be regarded in so far as a success. Ere we can treat of religion, for example, from the ethnological standpoint, we want to know more, not only of the mental constitution of races, but of the succession and development of faiths, than scholars are qualified to give, or the world is prepared to receive. It is the same with those other departments of inquiry to which we have alluded, politics, literature, and art, all demanding more data for their ethnic illustration than cotemporary learning is able to supply. But while granting this, and thus admitting not only the

possibility but the probability of error, it is nevertheless well that we should occasionally attempt the solution of some of these grander racial problems, if only that we may be thus made more fully aware of our deficiencies, and see more clearly in what direction, and on what particular subjects we lack the information requisite for a more effective prosecution of our inquiries.

And here let us throw out a word of caution to ethnologists, as we have previously done to their rivals, the scholars. In the advocacy and exposition of a struggling truth we are prone not only to exaggerate its importance, but while doing so to proportionately undervalue everything else. Thus, for example, while dwelling with well-intentioned pertinacity on the effect of race upon the development of art, we are prone to overlook the influence of circumstances as manifested in the spirit of successive eras, forgetting that it is ever by a combination and interaction of the outward and the inward, of environment and endowment, that man attains to the condition in which he has at any time existed. Compare, for instance, the art of mediæval with that of modern Europe, and you see at once the stupendous power of extraneous influences in modifying the manifestations of artistic proclivity in the same race, who, under the inspiration of a faith favourable to æsthetic culture, covered Europe with cathedrals, while in the puritanic severity of their earlier Protestantism, they were equally contented to worship in barns. Facts like these should make us cautious in the assertion of racial influence, lest in the excess of our zeal we overstate the truth, and so prepare the way for a future reaction in public opinion unfavourable to the prosecution of those very studies which seem to us so all-important.

From what has been said in the previous pages, it will be obvious, that we think a work on ethnology, in relation to art, demands attainments seldom, perhaps never yet, united in the same person. And it will, therefore, not be esteemed a very severe verdict, when we say that Mr. Fergusson is utterly incompetent to the task which he has undertaken in the appendix to his last work, *The History of Modern Architecture*, wherein, under "ethnology from an architectural point of view," he exhibits a most lamentable ignorance of the very elements of ethnic science, and confounds names and races with a reckless audacity that shows only how little he has read, and how much he has yet to learn, on the subject. He commences in error, regarding the creation of *one* PERFECT pair at the beginning, as in the present state of our knowledge the most probable of all the suggestions yet offered for a solution of the problem of race; whereas

it is precisely the most difficult, whether as regards the element of unity or perfection, but with both together is, as an ethnic hypothesis, practically unworkable. He proceeds in error, for he considers that mankind began with civilization, and have degenerated into barbarism, in consequence of their separation from the parent stock. While in strict correspondence with this, he regards the highly inflectional Indo-Germanic languages, more especially in their purer Sanscrit forms, as a remnant of the *primitive* tongue; while all philologists know that they are essentially conglomerate, and imply from their very structure the previous existence of monosyllabic and non-inflectional languages. Just as all archæology takes us back to the stone period of primitive savagism as the original condition of untutored man, whose primal civilization in a paradisaical and golden age, is obviously one of those traditional myths that sooner or later must succumb before the stern teachings of demonstrable fact.

The foregoing, however, are perhaps not so much the speculations of Mr. Fergusson, as the accepted dogmata of the school in which he has learned his slender elements of ethnic lore. But it is quite otherwise with his nomenclature and arrangement of races; for here there is a specialty of misconception and misstatement, for which no recognized school of ethnologists can be held justly responsible. He arranges mankind into four divisions, thus:—

TURANIANS—SEMITES—CELTS—ARYANS,

embracing under the first, it might be supposed, all the non-Caucasian or imperfectly developed races; and under the three last all the varieties of the latter. But even this rude classification is beyond him, as his use of the word Turanian at once indicates. Admitting that as a generic term it includes the Tartars and Mongols proper, and so covers the Chinese, Tungouses, Magyars, Lapps, and Finns, he nevertheless proceeds to inform us, with all gravity, that the ancient Egyptians were the typical Turanians, who it seems, as Phœnicians, were also the builders of Solomon's Temple. Serious criticism is here obviously impossible, and we can only say that when a man of Mr. Fergusson's ability and general attainments, can venture to put such ideas into respectable print it certainly demonstrates that the Anthropological Society has not made its appearance before it was wanted.

Strange to say, Mr. Fergusson's fundamental misconception in connection with the Turanians is in relation to his own profession; for he regards them as the great master builders of the world. Now the pure or typical Turanian is a tented nomad, who at most heaps

a mound of earth upon the corpse of his departed chieftain; and, in strict accordance with this, his grander labours, even when settled in civilized and agricultural communities, are still earthworks, sometimes imposing for their extent, but never admirable for the taste or skill evinced in their erection. It is the Caucasian who is the builder, beginning with the cyclopean, advancing through the Egyptian, and ultimately attaining to the classical and gothic styles of true architecture. When the pure Mongol attempts a temple, it eventuates in a porcelain tower at Nankin, simply a series of tents in superposition. To speak of the Tamul architecture of Southern India as a veritable product of Turanian genius, is like citing the massive grandeur of the Rhameses, as a proof of the innate greatness of the negro. In neither case were the primitive peoples of Eastern Asia or Southern Africa masters of the situation; on the contrary, in both we may safely predicate the presence and predominance of Caucasian rulers as the producing cause of those monumental remains, which now characterise these distinctly marked areas of ancient civilization. The truth is the pure Mongol is never an artistic builder, except under Caucasian leadership, and we may add in obedience to Caucasian designs; and it need scarcely be added that the same remark applies with still greater force to the negro, whose palace is a cottage, and whose temple is a hut.

Mr. Fergusson is equally unfortunate in his remarks on the Semites, who it seems never erected a building worthy of the name; and yet their especial areas in Western Asia and Northern Africa are still among the most important monumental sites on the globe; while the Saracenic architecture of Spain is the admiration of the world. But when we remember that the author has spoken of the Egyptians and Phœnicians as Turanian peoples, it may be concluded that our difference of opinion with him on this subject is not as to facts but names. That the Semitic type has hitherto proved incapable of attaining to the highest form of æsthetic culture may be readily admitted, but it should be remembered that the Jews, who are obviously Mr. Fergusson's typical Semites, were never the artistic section of the race, being surpassed in this not only by the Egyptians and Assyrians, but also by their nearer congeners, the Syro-Phœnicians and (Saracenic) Arabs. It is the last, who were probably the purest and highest form of the race, that is the most nearly free from Mongolic taint on the one hand, and from Negroid admixture on the other, whose lithe and elastic frames, elevated features, and finely arched crania proclaim them of the pure blood of the desert, who

have carried Semitic art to its highest refinement, and developed a style that may well be regarded as the Mohammedan rival to the Christian Gothic.

But we have thus been brought to a test of race which Mr. Fergusson, in accordance with his scholastic training in ethnology, seems to utterly ignore—we mean organic type. It is from his neglect or ignorance of this that he has been led into his contradictions and absurdities respecting the Turanians. Had he possessed the slightest idea of the radical distinction between the Brachycephalic Mongol and the Dolichocephalic Negro, he would never have spoken of an African race as Turanian. Nor with the most rudimentary knowledge of what this epithet really means would he have applied it to the finely developed, oval-faced, and nervous traders of Tyre and Sidon. Such errors as those we have alluded to, however fatal to his speculations as an ethnologist, might indeed well be pardoned in one whose refined taste and profound knowledge in connection with his own majestic act, should effectually plead his excuse for lapses in every other. But our duty as the representatives of a scientific anthropology, and our loyalty to the truth, alike demand an unflinching exposure of the fallacies and absurdities of that school of pseudo-ethnology, whose disciples, guided by a few philological analogies and other scholastic data, have ventured to speak of the migrations and displacement of races with a confidence that would be simply ridiculous, were it not also seriously obstructive to the progress of sound knowledge. Let us clearly understand that man must be studied not simply in language, but in structure; and that in proportion as we neglect organic type we are on the certain road to error.

Mr, Fergusson is somewhat more at home with the Celts, perhaps because he knows them better; and had he spoken of them as he has done of the Turanians there would have been a much nearer approach to scientific truth than his work at present contains. To treat of the latter as especially susceptible of æsthetic culture is simply absurd; but in reference to the former the assertion is the embodiment of a great ethnic fact, of which history and archæology are alike demonstrative. If we enlarge the term, so as to make it embrace the classic nations of the south, as well as the Nervofibrous peoples of Western Europe, *fine* art may be said to constitute their especial appanage. The massive grandeur of the Egyptian style shows ideality laboriously and painfully struggling into manifestation, through the superincumbent pressure of a ponderous muscularity

of type, demanding a corresponding materiality of structure in its edifices. While in the architecture of India and the farther east, from the Buddist and Jaina times to the epoch of the Mohammedan invasion, we see in the complexity and elaborateness of the decoration that toylike tendency which has ever characterized the smallheaded and nervous children of the Indus and the Ganges. That highest form of beauty, which demands only simplicity and purity, and that grandest phase of sublimity which depends on form and proportion rather than mass, were never seen in perfection till the Parthenon was placed on the Acropolis, and Phidias adorned it with the masterpieces of his genius.

The author's estimate of the Aryans has obviously been written from the English standpoint. Indeed he had better at once have called them Anglo-Saxons, for this is decidedly what he means. The gigantic practicability of the English mind, with which the world has been so superabundantly blessed within the last few generations, seems to have quite overmastered him; and he accordingly dwells with needlessly exaggerated force on the inductive and utilitarian tendencies of the plain speaking and common sense Aryans, who, unfortunately for the architectural world, have a most decided predilection for congregationalism and plain churches. Alas! indeed for the fine arts, wherever these hard-working, shipbuilding, roadmaking Aryans obtain the predominance. Æsthetic culture flies before them, while the viaduct supersedes the triumphal arch, and the whitewashed chapel takes the place of the gorgeous cathedral! No wonder Mr. Fergusson has slender faith in the art of the future. What indeed can be expected of a people wholly given up to spinning-jennies and power looms, and who prefer the profit derived from a red brick factory, with its smoking chimney, to all the unproductive glories of St. Peter's, and all the barren beauties of York Minster! What indeed is to become of mankind after the extinction of those great master builders, the Turanians, a catastrophe which it seems is more nearly impending than some soft-hearted philanthropists are willing to suppose, it is impossible to conceive. Our only hope will then be in the Celts, who are themselves, poor fellows! everywhere subordinated to these dreadful Aryans, to whom all edification, save that of making a fortune, is utterly abhorrent.

To be serious. Mr. Fergusson has mistaken the tendencies of an age for the characteristics of a race, and so attributed to the latter what is due solely to the former. Whether the Aryans proper erected temples in India or not, it is quite certain that the "Sanscrit speak-

ing" Greeks were the first artists in the world. And whether the English can or cannot erect tasteful and appropriate edifices now, it is demonstrable from existing remains, that they once enriched their country with abbeys and cathedrals, that are still the admiration of Christendom. Given a highly developed Caucasian race, richly endowed with creative power, susceptible to music, like the Germans, and capable of rising to the loftiest strains of dramatic and epic poetry like the English, and you have the elements out of which the purest and noblest art may at any time be evolved. But to nations as to individuals, there is a time for all things. We are the children of the inductive philosophy, and carried onward in the midway course of a materialistic and utilitarian era, we of necessity build steamships and construct railways; and as these are the best of their kind, so do they afford satisfactory evidence of a capacity, which wants but a higher and more spiritual inspiration to produce grander and more artistic results. When new temples are really wanted, that is when we have a living faith to put into them, Mr. Fergusson need not fear they will arise as by the wand of an enchanter, and cover the land with a grandeur and beauty of which no living artist has ever dreamed, and to which neither Grecian nor Gothic genius ever aspired.

Let us clearly understand this matter. Every style of architecture is but the manifestation of an idea; the temple is but the vesture of a faith. The stern power of the Osirian creed was befittingly reflected in the ponderous vastitude of Carnac. The grace and beauty of the Olympian deities, those glorious incarnations of all that is ideal and artistic in physical man and temporal life, found adequate expression in the harmonious proportions and faultless simplicity of a classic fane, that apt embodiment of finite thought and earthly aspiration; while the spiritual yearnings and heavenward tendencies of Christianity, with its overawing sense of the infinite and eternal, were befittingly mirrored in the dim vistas and far-stretching aisles, the lofty towers, and skyward pinnacles of a Gothic cathedral, that glorious symbol of the sublimity and severity, the grandeur and the gloom, of mediæval faith. Now, it is precisely because we lack a great inspiration of this kind that we have no architecture. We live under the eclipse of faith. Protestantism pulls down what Catholicism is too weak to build up. It is not among iconoclasts that true edification should be expected to prevail. It is on the flood tide of a new, not the ebb tide of an old creed, that humanity is borne to those altitudes of thought, where new and untried forms of beauty are revealed, as in beatific vision, to its rapt seers. From Britain

to Japan the world is in spiritual collapse. Everywhere the cry of desolation, the wail of despair, the groan of death, ascends from the deserted temple, whose priesthoods with difficulty repair the waste of time, and with failing hearts make a feeble show of resistance to their advancing and victorious foes. It is the twelfth hour of the night; and we must wait for the dawn, which will surely come, ere we can hope for the temple of humanity's glorious future, to become a realized fact among the things of time. In the interval we do well to reproduce classic or gothic piles, as temporal or spiritual occasions permit. Let us fully master the old, so perhaps shall we be better prepared to appreciate the new—when it is vouchsafed.

Let it not be supposed, from the rather severe tone of the foregoing remarks that we at all undervalue Mr. Fergusson's merits in his own department. As a writer on architecture his profound and extensive knowledge, combined with a naturally refined and cultured taste, eminently qualify him for his self-imposed task as the historian of the past, and the critic, if not the guide, of the present. But in venturing on ethnology he has entered on a domain of thought and knowledge for which his previous studies have but very imperfectly prepared him; and as a result, his remarks, however startling and ingenious, are utterly devoid of all scientific value, being based throughout on those misapprehensions which ever attach to the opinions of those who write on a subject which they have but imperfectly mastered. Let him not, however, despair even ethnologically. His superior talents, and vast attainments in his own particular sphere, may yet prove of immense service to anthropological science. We want his aid. There is an immense field of inquiry, where the properly qualified architect and engineer can alone efficiently aid us. We allude to the vast province of archæology. We want from the latter, both in his civil and military capacity, a careful survey and skilful restoration, both in plan and pictorial outline, of the great earthworks of the primæval and prearchitectural periods. We want him to afford us an estimate of the labour required, and the means employed for the effectuation of these stupendous remains of a prehistoric civilization. While from the former we need a similar restoration of all the more important architectural efforts of various ages and countries. Such a work might commence with the monolith and cromlech of the North-west of Europe and Southern India. Its second division should fully illustrate Cyclopean architecture in its successive stages, wherever found, whether around the Mediterranean area of the old, or amidst the tropical altitudes of the

new world. Its third chapter might embrace pyramidal erections, from the grandly sublime and finished masses of the Nile to the ruder teocallis of Mexico. Its fourth might be appropriately devoted to those caverned temples, where the taste and skill of early ages have stamped their lasting imprints on the living rock. And from this, emerging into architecture proper, we might, at a glance, survey the successive styles which have prevailed under Egyptian, Indian, Assyrian, Etruscan, Classic, Saracenic, and Gothic culture. For such a work Mr. Fergusson has peculiar qualifications. The materials must be largely in his possession, and in his Handbook of Architecture he has already approached to the fulfilment of the latter part of the idea. Thus, by a judicious application of the results of a life of study in his own branch, rather than by crude speculations on ethnology, to which he is incompetent, can he best serve the great science of man, and help us ultimately to some definite conclusions as to the effect of race on art.

CREATION OF MAN, AND SUBSTANCE OF THE MIND.*

By Professor RUDOLPH WAGNER.†

It was with some hesitation that I yielded to the repeated request of your worthy Secretary to deliver this address, a request backed by several eminent members. My friends were of opinion that a resident of this town, which you have honoured with your presence, should deliver the inaugural address, on some general scientific subject.

I have selected the science of man, that is anthropology, in its physical and psychical aspect, or rather a mere section of it, which, if I must give a name to my discourse, I shall term "Creation of Man and Substance of the Mind."

* An Anthropological Lecture, delivered at the first public meeting of the Thirty-First Assembly of German Naturalists and Physicians at Goettingen, Sept. 1854, by Professor Wagner of Goettingen.

† Several passages touching on the supposed connection of the science of Man with historical Christianity and Revelation have not been translated, as these subjects have nothing to do with Anthropology. Editor.

I trust you will not find the subject without interest. Whether the mode in which I have treated it will please you is a different question. There is also a local cause which led me to select this subject.

Physical anthropology, the natural history of the human species, had its scientific cradle within the walls of this city. The house (now devoted to a benevolent object) is still standing in which the man, from a few fragments which his grateful pupils sent him from all parts of the world, laid the foundations of a new branch of human science, which connects the natural history of our species with the history of the universe. Some of those present personally knew that man, and the documents upon which he founded his studies are preserved to our University, by the liberality of our government.

Blumenbach's style was so popular that the results of his investigations have become common property of all educated persons. His fundamental principles with regard to the natural connection and diversities of the nations on the globe are introduced in all our schoolbooks.

There is, however, one question which I wish specially to discuss, which is, whether certain dogmas touching the original relationship of the varieties of mankind have been confirmed by the enlargement of our ethnographical knowledge.

Let us glance at certain results, which I shall sum up in seven axioms.

Axiom 1. All physical differences presented by the various nations on the globe are not greater than the diversities presented by animals and plants of the same species, and which differences, *e. g.* in the dog and sheep, we term varieties.

All the facts collected since Blumenbach's first investigations, that is during the last eighty years, tend to confirm that axiom.

Axiom 2. The varieties of the human species consist, (*a*) of accidental varieties, *e. g.* albinos, owing to absence of pigment, occurring among all peoples, many mammals, and birds. (*b*) Climatic varieties, exhibiting the influence of climate in the colour of the skin, stature, etc. (*c*) So called *permanent* varieties, or *races*.

Axiom 3. The determination of the number of such races is, to a certain extent, arbitrary, depending on the degree of deviation which is considered requisite to constitute a separate race. Blumenbach, as is known, assumed five races, which on the whole correspond with the five parts of the world. With singular tact, he described the four continental races, or according to colour, the white, the

yellow, the black, and the red race. We may even retain Blumenbach's fifth race, the brown or Malay race, if we add as a sixth race the lank-haired race of New Holland, and add the Papuan as a seventh race, whilst we include the wool-haired negroes of the seacoast in the continental negroes. Linguistic investigations have since then established the remarkable fact that the great groups of languages appear to run parallel with the development of races.

Axiom 4. All races of mankind intermix; they are fertile, producing cross breeds, mulattoes, mestizoes, etc., which again are productive. All human races constitute, therefore, on physiological principles, but one species, which is here identical with *genus humanum*.

This latter axiom is now an undoubted consequence of the physiology of generation. It is established that only animals of the same species are fertile. Animals of different species may interbreed under particular, generally artificial conditions, but the offspring is sterile. This all-pervading law is necessary for the historical existence of the various species.

Axiom 5. Historical documents, mummies, and sub-fossil human skeletons prove that man has not undergone any material changes in form or stature; and geology has also proved that man appeared last.

To these five axioms we may add a sixth and a seventh, which I will put in the form of two questions, which are certainly the most interesting in the science of man.

Can all human races be reduced to one original type, and if so, how have the varieties originated? And again, can we, from natural causes, assume or deduce that they have descended from a single pair? You will admit that an affirmative answer to these questions, founded on science alone, irrespective of tradition, would be of the greatest importance.

Blumenbach adhered to the principle that all men were but varieties of one species, and he arrived at the result that there exists no sufficient scientific reason against the descent of these varieties from one and the same original stock. All races, he declares, run so much into each other, by so many gradations that only arbitrary limits can be given to each race.

This theory of Blumenbach has been much attacked, and a number of eminent naturalists, who have made this subject their special study, have arrived at the conviction that there must have been originally different stocks, and that the negroes and some other chief races had

their own Adams and Paradises; a result which no doubt appeared highly satisfactory to slaveholders. With regard to the number of these original pairs authors are much divided.

They have first assumed five Adams, corresponding with Blumenbach's five races; and subsequently extended the series to fifteen or sixteen Adams.

If you ask me on my scientific conscience, quite irrespective of my religious convictions, how I would formulate the final results of my investigations on this subject, I should do so in the following manner:—All races of mankind can (like the races of many domestic animals) be reduced to one original existing, but only to an ideal type, to which the Indo-European type approached nearest. The mode by which races have been formed is perfectly unknown. It reaches back in a primordeal time, perfectly inaccessible to science.

Whether all human beings descended from one pair can be as little proved by scientific data as the contrary theory; and in this respect theology can derive no assistance from natural science. Still the *possibility* of descent from one pair cannot, on physiological principles, be disputed. We see with our own eyes, in some colonies, physiognomical characters arise in men and animals which apparently become permanent, and exhibit certainly some analogy to the formation of races.

This is, if you like to take it so, my scientific confession of faith, as regards this interesting question, in which neither historical investigation nor anthropology, combined with geology, rest on a firm support, but are lost in an inacessible depth.

I now turn from the physical to the psychical aspect of the question.

Has physiology, which investigates the vital process of the individual, also occupied itself with the question what becomes of that individual after death, or what is tantamount, has this science which has made such progress, spoken out plainly on the nature of the soul?

Not all physiologists have ventured to touch this question; and if they have done so, they have either, on account of the difficulty of the subject or from other considerations, avoided to speak out plainly. Still, gradually, they have more and more encroached on a province which has hitherto been abandoned to philosophy and theology. Materialistic views have gained ground among naturalists, and specially among physiologists the belief in a substantial soul gradually diminishes, and the attempt to fuse psychology with natural science seems to be for him who can read the signs of the times the present problem. Though men perfectly acquainted with the present state of

our knowledge have pronounced against materialism, they do not deny, to use the words of an eminent philosopher now present, "that materialistic theories, which existed at all times, have in recent times been greatly encouraged by the progress of natural science." The great progress of these materialistic opinions induces us to investigate the chief arguments produced.

I select for this purpose some passages from the second edition of a work by a well-known and highly-gifted author. In his chapter on the functions of the nervous system and mental life, he says:—

"The seat of consciousness, of the will, is solely to be found in the brain. To assume the existence of a soul which uses the brain as an instrument with which it can work at pleasure is pure nonsense." .... "All mental activity ceases with death." .... "Physiology thus decidedly and categorically declares against individual immortality, and against all notions which attach themselves to the special existence of a soul. Physiology is not only entitled to treat these questions, but it has been justly reproached for not having touched them sooner, in order to point out the proper way for the solution of these questions. It has been stated that physiology advances beyond her province in investigating psychical phenomena, but it must study the functions of this substratum; and whatever physiology considers as such functions, must necessarily form the subject of her investigation."

This author, after citing the opinions of three eminent German anatomists and physiologists, concludes thus:

"With regard to myself, I can only say that every naturalist, if he thinks logically, must come to the same conclusions. I will not, however, deny that there are idiotic and obtuse naturalists."

Among the three physiologists cited by that author, there is one who honours us this day by his presence, and whom I had the pleasure of counting among my pupils, who has some reason to complain. The views which he expressed appear to me to have been much more restricted and more prudently expressed than to warrant his being so summarily counted among the adherents of materialism. One thing must be readily admitted, our author speaks clearly and plainly; we cannot complain of his equivocation. This honesty is praiseworthy. He gives an unvarnished answer to a delicate question. The consequences which are drawn from them are equally of remarkable simplicity. Our moralists, our theologians, our lawyers, will henceforth have a very easy office. "For," says the learned author in another work, "free will does not exist, and consequently no responsibility

and accountability such as moral or criminal jurisprudence would impose upon us. We are at no time masters of ourselves—of our intellectual faculties;—as little as we are masters that our kidneys should secrete or not secrete."

Thus, all the grand thoughts which the deepest philosophical investigators have acknowledged, which has inspired whole generations, are idle dreams, phantasms of biped mechanisms which run about on the surface, then become skeletons, are finally resolved into atoms, which are again combined, become again human forms, commence again their sphere of action, not unlike the dancing of lunatics in a madhouse. They have no future, no moral basis, no faith in a moral code.

It is the province of three great sections of this assembly to occupy themselves seriously with the question regarding the nature of the soul and its connexion with the body. I would, therefore, both in the interest of men of science and laymen, ask you:—

Do you think science is sufficiently advanced to decide the question on the nature of the soul? And if so, are you inclined to adopt the opinion of those who deny an independent individual soul?

These questions are plainly and clearly formulated. May your answer, whatever it be, be equally so. Half-and-half answers are unworthy of a scientific free thinker.

PICTET ON THE ARYAN RACE.*

When the great philological discovery of modern times was made, that all the languages of Europe, with a few exceptions, were sprung from one common tongue, most nearly represented by the ancient sacred language of India, the study of the branches sprung from this now extinct parent language became a matter of the highest moment to Ethnologists. For though it would not be sound reasoning to make language an absolute test of race, and to take away, for instance, the Cornishman from his connexion with the Welshman and plant him among the Saxons whose language he has adopted, or to say off-

* Les Origines Indo-Européennes, ou les Aryas Primitifs, Essai de Paléontologie Linguistique, par Adolphe Pictet. Paris: Cherbuliez, 1859-63.

hand, whenever we find a race of people speaking an Aryan dialect as the native tongue of their ancestors and themselves, that these people must be pure and direct descendants of a race who were ages ago the only speakers of a yet undivided Aryan speech, it is nevertheless true that such evidence is capable of giving us what is generally the most important element in the history of such a race. The evidence of language does prove beyond controversy, that the early race, which we call the Aryan, did once exist, and that, pouring itself out East and West in many waves of migration, it settled itself over almost all Europe and part of Asia. Partly by destroying or expelling the previous inhabitants, partly by taking them up into itself by intermarriage, and partly by thrusting itself among them as a dominant class, it covered this great part of the Map of the World with a collection of nations more or less purely Aryan in blood, but in language, mythology, laws, and customs, so deeply impregnated with Aryan influences, that even where the physiologist may refuse to recognise a family tie of full blood-relationship, the student of human civilization may be content to let education fill up the gaps left by blood, and to accept them as a whole under the popular name of the Aryan race.

This being admitted, there arise a series of important and interesting questions, which are to be solved more or less fully, upon philological evidence. What manner of people was this Aryan race before its division into the tribes, whose children, born or adopted, are known to us as Greeks, Celts, Persians, and so forth; what were their manners and customs, their knowledge of nature and the arts? How much of what we call the civilization of these great races was derived from their common parentage, and how much is the result of independent development after their separation from the parent stock, or of communication with other races, whether Aryan or not? And in what order did these branches of the race leave their original home, and how and when did they come to be subdivided into nations who have long forgotten their connection, not only with the original race, but even with the other members of the subordinate division of it from which they sprang?

Until M. Pictet's great work was published, the answers to these questions have been miserably fragmentary. Detached portions of them had indeed been worked out with great ingenuity and labour, but no comprehensive view of the whole subject was accessible to the student of Ethnology. The object of M. Pictet's book, the first part of which appeared in 1859, and the second concluding part lately, is to classify and compare the many languages of our Aryan family with

a view of answering as far as may be the questions of this kind which present themselves. The world ought to be grateful to the author for the mass of systematically arranged material and ingenious deduction which he has now for the first time laid before the student, and of which it is our object to give a short summary.

It is, however, necessary to make a remark on M. Pictet's method of reasoning, not in a spirit of captious fault-finding, but simply to warn ethnologists that the results brought forward are not always to be received unhesitatingly as established facts. A generation or so ago, when Sanskrit had just been discovered and partially explored, and its enormous value in restoring and completing the etymology and grammatical structure of our European languages was beginning to be recognised, it is not surprising that philologists should have run sometimes into extreme opinions as to the range of its application, and have been tempted to explain the origin of any doubtful word by rushing to the list of Sanskrit verb roots, and referring it without more ado to the root that came nearest to it in sound and signification. Had the Sanskrit roots given in the lists of the Indian grammarians been always to be depended upon as really having existed and borne the meanings assigned to them, this method would still have been unsafe, but it is clear that many of them are but figments of the ancient native philologists. These Indian grammarians, finding how large a proportion of the language was capable of being referred to verb-roots or dhatus really existing as verbs, tried to bring everything, or almost everything, down to similar elements, without making due allowance for the breaking down, confusion, and alteration of meaning inseparable from the very existence of a language which had emerged to a considerable extent from the genetic stage. To the undoubted root-forms of the Sanskrit the grammarians thus added, for etymological purposes, a great number of imaginary ones, sometimes real restorations of root-words which had fallen out of common use, but more often containing a partial and distorted view of a real root, or even entirely wide of the mark. When European philologists had got over the first exhilaration of discovery and settled the general connexion of the European languages with Sanskrit on a firm basis, it became the business of a school of laborious and exact Sanskrit scholars to test everything by existing Sanskrit texts, excluding all grammatical imaginations, and rather choosing to give up the prettiest and most plausible etymologies of European languages from the Sanskrit, than to found a derivation of a Greek or German or Celtic word on a verb-root, which might have never had more than a subjective existence

in the brain of some Indian Pandit. As a rough-and-ready illustration of the way in which these roots were sometimes made, we may imagine an etymologist arguing, that as *carrier* belongs to a verb to *carry*, so *cottier* should belong to a verb to *cotty*, with a sense of cultivating, or somewhat of the kind; or catching at the verb to *horse*,—"he horsed the Epping stage,"—and erecting it to the dignity of an original verb to which the substantive *horse* should be subordinate.

M. Pictet is one of the oldest and most successful workers in the field of Aryan philology; so that it is not to be wondered at that he should accept and reason on the roots catalogued by the Indian philologists with more confidence than the new Sanskrit purists consider justifiable, and he is therefore often at issue with them. It is difficult, therefore, for the student, who consults the work before us with a view to ethnological rather than philological results, to feel always quite sure of his ground.

A quaint old theory once obtained among doctors, that wherever a particular disease was prevalent, there nature always planted a suitable remedy. If stinging-nettles abounded, there was dock close by to cure the sting; if the ague were prevalent, there in the marshy ground grew the willow-bark to cure it. In the present case the old rule holds good. The great St. Petersburgh dictionary of Boehtlingk and Roth is already about half done, by means of which it is possible to know at once whether a supposed root is safe or not to be used for etymological purposes. And Professor Schleicher's *Compendium of the Comparative Grammar of the Indo-German Languages** now enables the ordinary student to trace with little difficulty the modications which vowels and consonants pass through in regular course in the various languages of the Aryan race, and to be able to stop any etymology which does not conform to the usual rules; and if it cannot produce strong evidence of its parentage, to reject it altogether or mark it as mere hypothesis.

The first book of M. Pictet's work starts on slippery ground. The task of comparing names of races and ascertaining their meaning is one in which certainty is hardly to be attained at any cost of labour and skill. That the connexion between the Ἀριοί, Iran, and Ireland is a real one, and that the name of Aryan which we give to the whole Indo-European family is a justifiable one, is an opinion very generally held. If the name is really a common one, what does it

* Compendium der Vergleichenden Grammatik der Indo-Germanischen Sprachen. Von August Schleicher. Weimar: Böhlau. London: Williams and Norgate, 1861-2.

mean? Arya means in Sanskrit a *master* or *lord*, also *excellent;* and ârya is a term used for men of pure race, of the dominant class. Or has the name of the race to do with the root-verb *ar*, to plough, Latin *arare*, English to *ear*, as distinguishing the Aryan race, as cultivators of the soil, from the Turanian or nomade races? Or is it something else, equally plausible, and equally uncertain. Quien sabe?

Where was the first home of the Aryan race? M. Pictet thinks in Bactria, or thereabouts, and gives his reasons, mostly founded on the Zendavesta, going afterwards into the vexed questions of the order in which the different peoples, Sclaves, Celts, and so forth, left the original home of the race, and the routes they followed.

The existence of the word *barbarian*, *βαρβαρος*, in Sanskrit literature of a tolerably early date as *barbara*, leads our author to believe that the Aryans, before the Greeks had gone off on their westward migration, applied this term, founded on an imitation of a confused and unintelligible sound, like *murmur*, to the surrounding tribes, who of course appeared to them, as foreigners do now to persons deficient in linguistic knowledge, as people "of a stammering tongue." He quotes in this connection, though without positively accepting it, an etymology of *Welsh* now usually admitted, connecting it with another onomatopœic Sanskrit root, mlec'c'h, to speak confusedly or in a barbarous tongue. This word resembles, though but in a loose way, the names equivalent to *Welsh*, which, with the sense of foreign or barbarous, have been given by several nations to their neighbours whose speech was unintelligible to them; as by the Sclave to the Wallachian (Wlach), by the German to the Italian (Wälsch), and by ourselves to the Cymry.

After this comes a discussion of the connexion between, or rather of the unity of, the *Yavanas* of Sanskrit literature with the Ionians or *Ἰάονες* and the children of *Javan*. Then follow other nations with similar names, the Iberians of Spain and of the Caucasus, the Getæ and the Goths, the Dacians and the Danes, the Sacæ and the Saxons. But this bringing together distant races on the strength of a resemblance between their names is very dangerous work, as any dispassionate student, when he has read Jacob Grimm's argument on these subjects in his *History of the German Language*, may judge for himself. It is a relief to come out into a clearer atmosphere, and to follow M. Pictet into his discussion of the names given by the different members of the Aryan race to some of the phenomena of nature.

The Aryans seem before their division to have divided the year into three seasons—winter, spring, and summer; while, as autumn is

known in the different countries inhabited by our race by entirely different names, it follows that it was not originally recognized as a separate season. The best series of common names are those belonging to winter and the phenomena belonging to it, as *hiems*, *χεῖμα*, Sclavonic *zima*, which are connected with Sanskrit *hima*, cold, snow, whence Himalaya, *the abode of snow*. The hypothetical derivation of hibernus as hi-bernus, with the sense of snow-bearing, hi being an imaginary relative of hima, and the rest of the word, from the verb bhar, to bear, is ingenious, but wanting in collateral evidence. For the verb to *snow* we have Zend *çniz*, Lithuanian *snigti*, Anglo-Saxon *sniwan*, Latin *ningere* (with the s dropped), etc.; while against Sanskrit *g'ala*, cold, we have *gelo*, *gelu*, our words *cold* and *cool*, with their earlier relatives in Gothic—*kalds*, Anglo-Saxon—*ceald*, etc., with Russian *goloti*, ice, and various others.

Spring does not go so easily and well in this comparison as winter; but M. Pictet's comparison of Sanskrit vasanta, with Sclavonic vesna, Latin ver, Scandinavian vâr, Greek ἦρ (for ϝηρ,) etc., seems to indicate a radical connexion among these words. Among the various etymologies of the Sanskrit vasanta, spring, he inclines to deduce it from the root vas, to clothe (whence *vestire*), as being the season in which the earth is carpeted or clothed with verdure. Such an epithet would be most appropriate, and we may suggest a similar name given by the ancient Peruvians to one of their months, paucar-hauray, or "meadow-carpet." The words by which summer is known are connected, as is natural, with heat and the sun.

The evidences we possess as to the original site of the Aryan race have led most inquirers to a belief in their having been settled, and having developed themselves into the state in which we get the first dim view of them, in the interior of Asia, separated by immense geographical barriers from the oceans of the north and south. The question whether they knew of the sea becomes, therefore, a very interesting one, and it may, in a certain sense, be answered in the affirmative. The word *mare* is no isolated word, for words more or less closely related to it are found through all our Aryan languages in Europe, except Greek, in Welsh *môr*, Gothic *marei*, Ags. *mere*, and so on; and these words our author connects with Sanskrit *mîra*, ocean, and etymologically with the root *mr*, to die, Latin *mori*, as being in another form the desert, lifeless, vastum mare, the desert itself being called *maru* in Sanskrit, and the same name being applied to mountains, as a rule wild and desolate places, in full correspondence with which may be adduced our word *moor*, old German *muor*, a marsh,

etc., etc. Without objecting to this, or contradicting M. Pictet's view that the sea our ancestors knew in their early home was the Caspian, we must protest against the argument that, as a sandy desert lies between Bactria and the Caspian, the desert and the sea would be naturally confounded in the Aryan mind. "It is, then, very probable that maru, and perhaps also mîra, designated all the western region, including the Caspian Sea, which was only its continuation."

With the same desire to make evidence, he adduces the Indian name for the west, varunî, as being the region of the sea, varuna; and argues that as the ocean should be the south, not the west, to the inhabitants of India, the name may be a recollection of the old time when they lived farther up in the interior of the continent, and had the Caspian at their west. But, to say no more, varuna is a general term for an expanse, which may be the sea, but which is also the firmament of heaven, *Οὐρανός*.

At p. 118 are some very suggestive remarks on the German word Sünd-fluth, literally "Sin-flood," the deluge, which philologists have so often referred to as an example of the way in which the popular mind insists on thrusting a sense satisfactory to itself into words which it does not understand. The old German sint-fluot, of which sünd-fluth is a corruption, has certainly nothing about sin in it. M. Pictet explains it as corresponding to an imaginary Sanskrit compound, sindhupluta, of which the latter part is our word flood; while sindhu, sea or river, is in the latter sense a familiar name to us in its different modifications—Sindh, Hindo-stan, Indus, India. The old word sint-fluot, connected with the diluvial tradition which the Aryan race possesses in a different form to the Semitic race, should, if this etymology prove sound, mean simply "the sea-flood."

It is impossible in so short a space to give even a summary of all the subjects which are treated upon in the work, and we pass over the designations of stone and rock, valley and river, to the department of natural history, which begins with the names of metals, and the historical arguments to be founded on them.

A certain knowledge of the metals which were known to the different branches of our race at the time of their separation would be important, as showing the relative state of their civilization, but there are great difficulties in arriving at this. In the first place, the names of metals naturally travel from one country to another with the metals themselves; so that we are liable to take a lately-imported word for one derived by hereditary descent from the common stock; and, moreover, different metals have very frequently been confounded

under the same names. Passing over the names of compound metals, such as *brass* and *bronze*, which are merely varieties of one word, we have a name of iron, *αἴδηρος*, so like the names of *silver*, Gothic *silubr*, Lithuanian *sidábras*, that a common sense, apparently that of whiteness or brilliancy, probably belongs to both, as the meaning of shining does to the Sanskrit words rag'ata and rag'ant, both from the root rag', to shine, signifying one silver, and the other gold. The etymological connection between *æs*, *æris*, and *iron*, Gothic *eisarn*, which has been maintained by eminent authorities, is denied by M. Pictet. His conclusions on the subject of metals are, that the Aryans were acquainted with gold and silver, iron, copper, and bronze (which compound metal necessarily involves a knowledge of tin), though for tin itself linguistic evidence fails. To this list must be added lead, which our author considers them to have been acquainted with, though the evidence from language is of the weakest possible description. Apropos of this metal he reasons, that as it does not alloy with copper, and would be of little use for weapons, etc., by itself, it may have been considered as worthless; so that its original names may have been forgotten by the migrating tribes, until they came to know its uses, when they named it afresh. The statement that lead does not alloy with copper is not, however, technically correct. Such an alloy not only exists, but is largely used in England, under the name of "pot metal."

Passing to the consideration of the trees known to the Aryans, we find a confusion of names like those just noticed among metals, between two trees with edible fruit, the *beech*, *fagus*, and the oak with eatable acorns, in Persian *bûk*, Greek *φηγός*, which names being derived probably from the root bhag', to eat, *φάγω*, are as applicable to the one tree as the other; so that the fact of this name being widely spread among the various branches of our race does not lead to a clear result. Nor does it seem possible to trace by clear evidence of language any of the wild trees of Europe, with one exception, back to the epoch before the separation, though among their names are to be found a number of very wide-lying analogies, as in the names of the poplar, willow, etc. The exception is the *birch*, Sanskrit *bhûrg'a*, Russian *bereza*, Anglo-Saxon *beorc*, etc. It is, at least, M. Pictet's opinion that this reasoning is safe; and he even suggests the very natural derivation of these various names from the various equivalents of the word *bark*, the birch being distinguished by its soft and flexible bark, which is used for various purposes. It is to be remarked, however, that bhûrg'a does not admit of any direct explanation in Sanskrit.

The philological information as to the fruit-trees known to the Aryan race, is of the same scanty and doubtful character as that which relates to forest trees. Even where a name is common to several branches of the race, it is only partially possible to distinguish between words belonging radically to the language in question and words received from other races, together with the products they refer to; and, moreover, the names of many of them are very indefinite, as, for instance, that of *nut*, which is common to the Latin, Germanic, and Celtic languages, with phonetic variations, which show it is not a borrowed word. Its probable etymology connects it with *knot*, but there are so many kinds of nuts that the existence of a common name, even if it ran through every language of the race, would give us no information as to the kind of nut eaten by the Aryans, and would indeed tell us little more than the existence of common words for *tree* or *fruit*.

The difficult question whether the grape-vine and wine were known to the ancient Aryans is decided very confidently in the affirmative; but whether students will be thoroughly persuaded by the train of reasoning is another matter. It is one of the most puzzling questions which arise, in attempting to trace history by the aid of words, which may be applied to many different things. The Greek *μέθυ*, wine, English *mead*, in connection with the Sanskrit madhu, sweet, gives no information as to the material of which the drink was made, which is just what we want to know. The etymologies of *must*, from Sanskrit mud, to be intoxicated, and of *wine*, from Sanskrit vena, delightful, a term used for the sacred Soma-liquor, whether they are right or wrong, still tell us of nothing but intoxicating liquor in a general way, but nothing about the materials of which it is made. Moreover, the way in which words for one drink travel over the world, to be applied to others of a different nature, is well known. The name of *toddy*, that is, palm-wine, has gone into the uttermost parts of the earth as a designation for spirits and water; and *arrack* has a special meaning in England, which does not belong exclusively to it, as arak is used in Persia, etc., for spirituous liquors in general. The resemblance between Sanskrit rasâ, Greek *ῥᾶξ*, Latin racemus (whence raisin, etc.), is certainly strong; but we think that the Ethnologist, whose general rule, in arguing upon the results obtained by the Philologist, ought to be "certainty or nothing," will prefer to leave the question open, to accepting on the evidence adduced, the conclusion that the ancient Aryans had vines, and made wine of the grapes.

The names of the different kinds of grain present the same kind of indefiniteness that belongs to fermented liquors and fruits. General terms, derived, like *corn*, or *grain*, or *triticum*, from the notion of grinding, or the like; or the words *froment*, from *frumentum*, *frui*, and *oats*, Anglo-Saxon *ata*, Sanskrit *ad*, to *eat*, tell us nothing as to particular species or varieties of grain. The meanings of such words shift with circumstances. The word *corn*, for instance, which means wheat in England, is always used for maize in the United States. Of course the cultivation of grain by the early Aryans is an acknowledged fact, proved by a mass of evidence; but the particular kinds of grain which they cultivated are, and perhaps always will be, somewhat doubtful. Some of the evidence which M. Pictet has to offer, as to details, is as follows:—

In Sanskrit, wheat is known as mlec'c'hâça, mlec'c'habhog'ana, that is to say, food of the barbarians. Such a name seems, at first sight, to argue that the Indians did not possess this grain, and that it was not known to the ancient Aryans; but the difficulty is removed by the consideration that the centre and south of India are too hot for wheat to flourish, while in the north, in the regions of the barbarians, the climate suits it. When the Indian branch of the Aryans descended into the warm regions they now occupy, they would naturally drop the cultivation of wheat. The name of *wheat* is no doubt from its being the *white* grain, but its name is often confused with that of barley, so that, though it is probable that the Aryan race may have cultivated both wheat and barley, the philologist alone cannot prove this, and must call in the aid of the botanist. The name of *rye* is a striking example of this indefiniteness in the names of different kinds of grain, and M. Pictet goes into an elaborate comparison of terms in support of the view that *rye*, Anglo-Saxon *ryge*, Polish *rez*, Thracian *βρίζα*, is the same word as *rice*, Polish *ryz*, Greek *ὄρυζα*, the whole being referred to Sanskrit *vrîhi*—a name which is applied to rice, and involves merely the idea of *growing*. The case seems satisfactorily made out that the names for these two different grains are the same, and that in all probability the Indian branch, when they came down into a rice-growing country, applied to this grain their old name for rye, but the proof has the effect to our minds of sweeping away the last vestige of certainty in tracing the cultivation of any particular grain back to a remote period and a distant country, by purely linguistic evidence. The name of the *pea*, Latin *pisum*, is found in Sanskrit as *peçi*, and its etymology involves, probably, the sense of pounding.

We pass over a number of other plants, respecting which, M.

Pictet has collected most valuable information. It is evident that the subject has not been yet brought into a state fit for the use of the ethnologist, though we are by no means prepared to offer a contradiction of our author's view that the plants, wild and cultivated, whose names go back to Aryan origin, all belong to a flora which can only have subsisted in a temperate region, and which has a generally European character.

Fortunately, the specific characters of animals are much more definitely distinguished by their names than those of plants, and the study of the names of domestic and wild creatures, even down to small insects, will suffice to give a general view of the fauna of the region inhabited by our race before its separation. Setting aside questions of varieties, the ox, horse, sheep, goat, pig, dog, were undoubtedly known by them, while there seems no direct proof of their having domesticated the ass and the cat. We can do no more than allude to M. Pictet's remarks on the names of the camel. The existence of a German name, resembling that of the *elephant* but applied up to mediæval times to the *camel*, is a curious phenomenon, which has attracted much attention. The Gothic *ulbandus*, Old German *olpenta*, Anglo-Saxon *olfand*, are all terms for the camel, and the coincidence has usually been thought an excellent example of the way in which the popular mind might confuse the names of two great beasts of distant countries. Our author takes velibădu, the ancient Slavonic name of the camel, to be a name explainable in Sanskrit, as vala-bandha, big-body, and apparently not the same word as elephant.

The domestication of poultry, as M. Pictet remarks, belongs to an advanced state of civilization. The name of the goose is one of the best examples of the name of an animal running through the whole of the Aryan languages, Sanskrit *hañsa* (the laugher), Old German *kans*, Anglo-Saxon *gos*, Scandinavian *gâs*. The Greek χήν has lost the final sibilant, and Latin *anser* probably the initial aspirate, and there are a score of other equivalents in the languages of Europe and Asia. The names of the swan and duck are sometimes confused with that of the goose. An objection might be raised to M. Pictet's argument, that though very early records show the goose domesticated in Greece and India, and there is very strong ground for believing that the Aryans had it in a domesticated state before the separation, yet various species of geese are found wild over Europe and Asia, and the common name makes no distinction between a wild goose and a tame one. The same remark applies yet more forcibly to the duck.

M. Pictet, considering the *cock* to be descended from the Himalayan species, argues that the ancient Aryans had it domesticated in their poultry-yards, though in early times the Greeks seem not to have been acquainted with it. Its name is an imitation of its cry, Sanskrit *kukkuta*, Slavonic *kokoshu*, Anglo-Saxon *cocc*, similar names being applied to very different birds, as Lithuanian *kukuttis* to the hooppoe, French *cocotte*, a very general name applied to the parrot, and English *cockatoo*. To Skr. *kânuka*, Persian *kanak*, belong Gothic *hana*, German *hahn*, of which we have only the feminine form in *hen*, and their meaning is "the singer", Skr. *kan*, Latin *canere*, while *gallus*, Persian *gâl*, has a similar origin.

The *bee* and *honey* were well known to the Aryan race, but evidence fails to prove the existence of the art of bee-keeping.

The *mouse* is called in Sanskrit *mûsha*, that is to say, "the thief," from mush, to steal, and the name goes through almost the whole circle of the Aryan languages, Greek *μῦς*, Latin *mus*, Slavonic *myshi*, etc. The *flea*, Latin *pulex*, Anglo-Saxon *flaeh* is referred to Skr. *pulaka*, which has the general sense of parasitic insect and a derivation from the root *pul*, to swarm. The name of the fly, Sanskrit *makshiká*, Latin *musca* (whence *mosquito*), Greek *μυῖα*, German *mücke*, English *midge*, includes several insects, to which the derivation from the root maç, to sound, as being humming insects, is more or less applicable.

The similarity of the Hebrew name of the *lion*, levi, lavia, with *leo*, etc., makes it a difficult matter to know whether we are to refer both to one origin or not, and Coptic *laboi*, used both for bear and lion, makes the question still more perplexed. Our author considers the European name of the king of beasts, Latin *leo*, Greek *λέων*, Old German *lewo*, Slavonic *livu*, Lithuanian *lutas*, as genuine Aryan words connected with the root lû, to tear, or destroy. The lion existed in Thrace, etc., up to a comparatively late period, and M. Pictet makes the not improbable suggestion that the Cave-Lion was still living in Central Europe at and after the arrival of the divisions of the Aryan race. With the bear, there is of course no difficulty in considering its name to be lineally descended from that in use in Bactria, or wherever the Aryans may have lived in Central Asia. The Sanskrit *rksha*, Greek *ἄρκος*, *ἄρκτος*, Latin *ursus*, are clearly allied. The wolf and the fox, whose names are sometimes confounded, infested the flocks and farmyards of the Aryans.

M. Pictet refers the name of the badger, Latin *taxus*, Italian *tasso*, German *dachs*, to the Sanskrit root *taksh* as being "the cutter," and

accounts for the mention of skins of *tachash*, translated "badgers' skins" in the Book of Numbers, as having come by commerce with Persia, and attaches more certainty to this conclusion than seems at all prudent.

The *otter* is an animal whose name, Greek ἐννδρίς, Lithuanian *udrà*, is clearly significant of its living in the water, and allied to Sanskrit *udra* and to the root *ud*, to *wet;* but this word, as its sense allows, is used also for the crab; while in Zend the meaning of udra is in like manner doubtful between the otter and the beaver, to both of which it is equally applicable. The name of the beaver, found almost throughout Europe, as in Latin *fiber*, Anglo-Saxon, *beofer*, Lithuanian *bebrus*, etc., appears to be an Aryan word transferred from other animals, or at least belonging indefinitely to several, as in Sanskrit *babhru*, rat and ichneumon, Persian *bibar*, mouse. Its meaning is apparently "the *brown* animal." The *hare*, German *hase*, Sanskrit *çaça*, is "the leaper;" while Greek λαγὼς is compared with the Sanskrit root *lagh*, transilire, and *laghu*, light, swift. The rabbit, or *coney*, Latin *cuniculus*, belongs to the verb *khan*, to dig, whence *canal*, etc., names derived from which are also applied in Sanskrit to the rat, and in Russian, etc., to the marten, from their burrowing habits.

The name of the crow, Sanskrit kârava, is of great philological interest. In Sanskrit a number of words are formed by prefixing the interrogative particles ka, kat, ku, etc., to nouns with a sense of depreciation. The name of the crow is thus derived from ka-ârava—"what a voice!" This formation is common enough, as in such instances as kad-adhvan, a bad street, literally "what a street!" and ku-vanga, lead, literally "what tin!"

But the absence of such a mode of formation in the European languages gives a high interest to such words as are to be found in them, which seem to have been formed in this way while the language was still in a state which admitted of such a formation, which is found clearly defined in Sanskrit. Professor Pott has made an elaborate examination of such words in the new edition of his *Etymologische Forschungen*. To the Sanskrit name of the crow, *kârava*, is compared Latin *corvus*, whence, by transmission, English *crow*; while Anglo-Saxon *hreafn*, *raefen*, English *raven*, are allied by real relationship with some form similar to kârava, but with an *n* at the end of it. With reference to the raven, M. Pictet states the curious but speculative question, whether the extraordinary similarity between the Semitic names for the raven, Hebrew 'oreb, Arabic ghurab, which have no known etymology, and those of the Aryan language, make it

probable that the Hebrew name of the raven, which is mentioned early in the book of Genesis, is of Aryan origin.

With reference to the inquiry whether the ancient Aryans were acquainted with the ocean, or with some inland sea only, M. Pictet's remarks on the names of various shells should be noticed. The connection between Sanskrit *çankha*, Greek *κόγχη*, Latin *concha*, has often been remarked, and would seem, at first sight, to prove that the fact of the ancient Aryans having a name for the great sea-conchs, used for trumpets and vases, must show that they were familiar with marine products, and, therefore, with the sea, before their separation. M. Pictet gives a very plausible etymology of çankha, by comparing it with çâkhâ, a horn, which being used for a drinking-vessel and a trumpet, would be extremely likely to pass to the great shells which were used for precisely the same two purposes. But his reasoning, that the common name proves anything whatever about the proximity to the sea of the people who used it, breaks down utterly on other grounds. The argument "for it is not to be believed that shells should have been the object of distant commerce at so remote a period" is quite worthless, seing that it is a known fact that hardly any objects of nature or art do travel so far even among barbarous tribes as the large and beautiful ocean-shells. The fact of the great shells of the Gulf of Mexico having been carried at remote periods from tribe to tribe of North America, far up into Canada, is a sufficient answer to the argument that the possession of sea-shells by the Aryans proves anything as to their geographical position. Our author's remarks on the name of the *oyster*, which, though not in Sanskrit, is found through the European branches of the race, tend to prove that the western section of the race became acquainted with it at a very early period, and in this instance it is reasonable to suppose that they must have lived somewhere near the sea-coast where it is found, as at so early a period the edible oyster would not be carried far.

In concluding his remarks on the animal kingdom, M. Pictet calls attention to the very suggestive consideration, that the Aryan race seem to have gone, so to speak, to first principles, in naming the animals with which they were acquainted, by some epithet characteristic of the qualities distinguishing them, not applying to them old words inherited from some other stage of development of language, with their forms mutilated, and their sense lost. The idea of the fathers of our race having begun at the beginning, not only in developing their civilization, but even in naming the plants and animals around them, from general terms expressing their quality, gives us a sense

of the independence and originality of the Aryan mind, that may well excite our astonishment, and give us a higher appreciation of the part which our race have played in the history of the world.

We propose to give in a future number, a sketch, necessarily very slight and incomplete, of M. Pictet's second volume, which is devoted to the examination of the Civilization of the Aryan race in their early home, the circumstances of their pastoral and agricultural life, their arts of war and peace, their social condition, laws, science, and religion.

ETHNOLOGICAL INQUIRIES AND OBSERVATIONS.

By R. KNOX, M.D.

Inquiry into the Influence of Climate and of Hybridity over Man.

The natural antagonism of race to race; the antagonism of man to nature's works; the laws negating hybridism in man; the tracing certain races of men to continents or centres of creation now submerged; and the influence of climate in destroying aggressive races —these were amongst the earliest of my ethnological inquiries, undertaken at a time when the superficial work of Prichard had entire possession of the field of ethnology.

The theories which all but universally prevailed before the publication of my lectures on the Races of Man, were, that all men being of one species, the varieties they present are more apparent than real; that it is education, government, climate, and civilization which give rise to these varieties, men being everywhere the same *au fond:* in a word, the hypothesis of Hippocrates continued to prevail until the date I refer to; and, moreover, in respect of the acclimatization of man in various regions of the world, it was boldly asserted that with time and care all varieties of men might be dislocated from the land of their origin and transferred to other regions and other climates, to which they would become habituated, viable, progressive, and as it were aboriginal. Now, although such theories found no support in history, they maintain their ground to this day; and for this simple reason, independent of others, they tallied well with certain theological hypotheses, in the support of which interests unexampled in the history of man for magnitude and importance had been long em-

barked. To the theories just mentioned there was added another, namely, that the various species of animals which adorn the earth were in reality hybrids, produced by the admixture of a few primitive species with each other. This doctrine, supported by the illustrious Broca, the first of living ethnologists, I shall afterwards consider. Let us, in the meantime, attend to the question of acclimatization, and its influence over man. The theories offered by me some twenty years ago, as substitutes for the then received ideas on this subject, were that, when races of men abandon the lands on which they had grown up—their so-called aboriginal land—emigrating to another continent or zone of the earth, they either wandered into desert regions, uninhabited by beast or man, or into others occupied by a section of the human race. In either case it seemed to me certain that the emigrating and obtrusive race became extinct in time. For, either they were speedily absorbed by the stronger or more numerous race in possession (as the Goths, Germans, or Gauls in Italy*), or, unless continually fed by fresh waves from their original soil, they gradually altered, deteriorated, and withered away, and so becoming non-viable and non-productive, perished. It is needless to say what opposition a theory of this kind met with in North America.

All physiological and zoological theories must, to be trustworthy, be based on observations made on the species in question, and not on analogical arguments drawn from other species. This is my answer to most of the strictures made on my work on the *Races of Men* by a distinguished zoologist, M. Quatrefages. Whether the great and glorious French nation, the most illustrious for literature, science, and art since the Roman period, the most energetic, the most highly civilized, be a hybrid race, as my esteemed friend M. Broca maintains, or not, I shall hereafter consider. But, in the meantime, one experiment at least, on the largest scale imaginable, has been made in comparatively modern times, having a direct reference to these all-important questions, which the theologian, the statesman, and the dynasties of the earth would fain have men believe to be theoretical and of no importance. In vain! Let any unbiassed mind turn over the page of history for the last twenty years, and calmly look at the

* The history of the Goths is remarkable. When they first encountered the Roman arms, they occupied both banks of the Lower Danube, stretching towards the Euxine and the Dniester. They emigrated into the Roman empire in vast numbers, bringing with them their wives and children. For a time they were masters of Italy; under the name of Austrians, they still hold Venice. Now, how is it they could not maintain their ground in any of the fine colonies they occupied for so long a time?

attitudes of the nations, and he will, I think, be forced to admit that, under the mass of political verbiage, of *persiflage*, of so-called national interests and dynastic pretensions, there lies the question of race, which, sooner or later, will upturn the world. What is the grand question which now agitates America? Is it not a question of race? What has brought Austria to the verge of destruction? Is it not this question of race? What agitates Russia and Germany, England and India but this question of race,—the antagonism of race to race,—the mysterious unextinguishable dislike of race to race? Humboldt, the most illustrious of modern philosophers, as he has been called, although he was no philosopher in the strict sense of the word, but a man devoted to facts, experiments, and direct intuitive observation, published,* in 1808, his political essay of the kingdom of New Spain, which in fact means Mexico. He had examined into the condition of that dependency of the crown of Spain with infinite care and labour, neglecting no source of information. Here are the results nearly in his own words:—"Mexico cannot be arranged under the head of tropical countries: the mean temperature of the great plains, of those situated at least within the tropics, elevated about 984 feet above the level of the sea, does not exceed 77° of Fahr., that is to say, 14° or 15° greater than the mean heat of Naples. From the configuration of the country you may, with a thermometer in your hand, select, within the distance of a few leagues, any temperature you choose, from that of frozen Lapland to the arid heat of Algiers. On the declivity of the Cordilleras there reigns perpetually a soft spring temperature, which never varies more than 4° or 5° cent. (seven or nine of Fahr.) In the capital of Mexico the centigrade thermometer has been known to fall below the freezing point. If Europeans cannot live and thrive in such countries, where can they live? The whole table-land of Mexico has a medium temperature about that of Rome. Moreover, the country abounds with every production that man can possibly want or desire."

In 1793, according to M. Humboldt, the population amounted to 4,483,529: he estimated the population in 1803 to be 5,808,000; and he inclines to the opinion that the population may double itself in about forty years. The *vomito prïeto* is a scourge confined to the coasts, and does not carry off annually more than 2,000 or 3,000 individuals. As to emigrants, Europe does not send more than 800 to Mexico;† and he concludes that the progress of population in Mexico

* Paris, 8th March, 1808. I quote the translation by Black, the original not being near me at the time.

† So soon as the emigration from Spain began to decrease, Spain recovered

and North America is solely derived from an increase of internal prosperity. We shall see presently how singularly erroneous were his conclusions. From these, and other data and reflections, the celebrated traveller and natural philosopher foretold a brilliant future for Mexico! Ignoring the history of the past and the natural history of man, forgetful of all the moral and physical circumstances that regulate the future, he could see no obstacle to the transference of race from one continent to another. He had become, in truth, wholly a political economist—a disciple of Adam Smith and a colleague of those geometricians, mathematicians, and statisticians who leave nature altogether out of the reckoning. In his time the population of Mexico was composed of—1. Individuals born in Europe. 2. Spanish Creoles, that is, descendants of Europeans, but born in Mexico. 3. Mestizos, half-castes between the whites and Indians. 4. Mulattos, between whites and negros. 5. Zambos, between negros and Indians. 6. The copper-coloured Indians. 7. African negros. Lastly. A few men of Chinese and Malayan descent had found their way into Mexico.

This was the character of the population by whose means Canning, Guizot, and others (profound statesmen!) hoped to redress, and foretold that they would redress, the balance of the Old World by the New. My answer, on reading their statements, was immediate, and amounted to this. A premier of England may perform wonderful things; he can erect kingdoms and make kings, but he cannot form a race.

About three hundred years ago, Cortez set his foot on the American continent, accompanied and followed by the best blood of the Spanish race. So long as Spain could stand the drain, Mexico held its ground, Spain, in the meantime, becoming wholly exhausted; and now, despite of the sad experience of the past, they again attempt the same insane game, to be followed by the same results, proving the adage, if it required any proof, that individuals may occasionally profit by the experience of the past—generations of men, never. But yesterday, as it were, Don Pacheco cautioned the Cortes, and through it the Spanish nation, to be prudent and moderate in their next attempt on Mexico and the continent of America. In Mexico he proved the Spanish race was reduced to 8,000, the rest of the nation was one of mulattos or hybrids (a worthless rabble) and of men of the pure

from the exhaustion caused by the drain of her best blood to America. Macaulay is of opinion that Ireland has never recovered the loss of Fitzgerald and the 7,000 men of the best blood of the race, who quitted Ireland with him in 1790.

American blood. He thus warned the Spanish nation what they were to look to from such elements of population. The elements of the present Mexican population, I said, are doomed to destruction. The European element will perish so soon as the European supplies are withheld. The hybrid of all sorts will also necessarily perish; and, with time, the whole population may revert to the primitive Red Indian, the untameable savage, who is now as he was in the time of Cortez. This picture has been drawn by Humboldt. And now, in about fifty years from the period of Humboldt's dream of the progress of the kingdom of New Spain or Mexico, see in what the experiment, for such it is, has ended! I quote no idle traveller, wandering about to amuse himself, without either information, powers of observation, or authority. I quote the official report of D. Pacheco, sent out by the government of Spain, an adept in the laws and manners of the country, a Spaniard himself, and fully disposed to say all that he could in favour of his quondam countrymen.

It was stated in the Madrid journals some years ago, that the Senate commenced, the day before, the discussion of the paragraph in the address relative to Mexico. The principal speaker was M. Pacheco, at one time ambassador to that country. He detailed, at considerable length, the wrongs which Spanish subjects have suffered at the hands of the Mexican government, and declared, in his opinion, the intervention of Spain was not only justifiable, but imperatively called for. The Madrid *Gazette* furnishes the following digest of this, on many accounts, important speech:—

"For the person sent to Mexico (that person was myself), it was needful that the Spanish Government should decide on pursuing in Mexico an active policy. Here is the *resumé* of that policy. 1. To place ourselves at the head of the Spanish race in America, while making them comprehend that we have *bona fide* accepted their independence; but that, in the natural course of the world, Spain is, and must be, at the head of all the individuals of that race. 2. There is in America a nation that is not of Spanish origin, the population of North America, which circumstances render a rival to ours. That race pretends that the Latin race must be subordinated to it in America —an absurd pretension of the Anglo-Saxon race, and in my opinion utterly without foundation. 3. Protection to Spanish interests. In Mexico there are 8,000 Spaniards, who represent 150 millions of piastres. Such were the fundamental principles of the instructions that were given to me. (M. Pacheco read his instructions.) On leaving for America I believed, in common with almost everybody in

Europe, in the triumph of Miramon. When I arrived, things were changed. Seven Spaniards had been assassinated, and the assassination was committed, not by private individuals, but by the leaders of the constitutional forces of the army of Tauerez. One of these leaders was Carvajal, who, after these sanguinary deeds, was promoted to be a general. I then found there was in Mexico a Spanish party and an anti-Spanish party. I say a Spanish party, not because they would be disposed to sell us their country, but because they have analogy—affinity with us, because they retain the traditions of their origin. I say anti-Spanish, when speaking of the other party, because they began the war of Mexican independence by assassinating our compatriots, and because they cease not to repudiate their origin. The Spanish party is that which has risen against the constitution of 1857. It reckons within its ranks all the illustrious of the country. We find in that party Alamar; Cobo is one of them; there are also Bonilla, Lara, Ramirez, Father Miranda, and Helguero. The other party is the one that hates us, that is selling its country to the Anglo-Americans, and that erases the word Mexican from its constitution. The party that in Europe is termed re-actionary and clerical, is tolerant and liberal; it tolerates even liberty of worship. The Federal party, on the contrary, is a party of barbarism, a disorganising party—a party that aspires not to produce the annexation of the country to the United States, but rather to introduce anarchy into Mexico, by means of divisions, and by establishing twenty republics, in place of one. I add, that the majority of the Spanish party consists of whites, of men like ourselves, whilst almost the whole of the Anti-Spanish party is of mixed blood. The Indian race, who form the majority of the country, are most submissive, and most easy to govern. Compelled to halt sometimes among that population, on my way to Mexico, those people asked me for news of the Queen, our Sovereign. I replied, the Queen is my Sovereign, not yours; for you are Mexicans. But they answered, We have always heard our fathers say "the King, our Sovereign;" and that is why we also say the 'Queen, our Sovereign.'"

M. Pacheco afterwards stated the remarkable fact, that in the space of forty years, Mexico has had not fewer than fifty-five different governments. In conclusion, in 1793 there were, according to Humboldt, 272,000 whites in the West Indies, and in all New Spain 1,200,000; now there are 8,000! In Jamaica, in 1787, of every hundred inhabitants there were ten whites, four people of colour, and eighty-six slaves; now, in the whole island, there are 13,000 whites,

90,000 browns, and 501,000 negroes. Verily Jamaica, Hayti, and Mexico make wonderful progress—downwards into that dark abyss where all civilization ends. Yet all races have a civilization of their own, such as it is.

The same remarks are strictly applicable to Brazil, and the Lusitanian possessions in Africa; the mother country has been drained of her best blood, and the result is worthless. We have it from the latest travellers, that the ignorance of the so-called Brazilian is something astounding. The same fate, as I long ago foretold, awaits the Anglo-Saxon of the Northern States, so soon as the tide of European blood ceases to flow into their territory: and so it will be with the Tasmanian and Australian of European descent. The time was when the Mongol held Central Europe: where is he now? Northern Italy was Celtic, and Milan a Gaulish city: what has become of the Gauls of the Gallic Cisalpine? Is there any Frankish, that is German, blood in old France; or any Vandalic blood in Northern Africa; or any Gothic blood in Italy? Yet I am free to add that there may be many exceptions to these laws, and that there may exist a race of men equal to any climate. These laws, for example, do not seem to apply to many other animals, nor to some plants. Wheat, first introduced into the American continent by Europeans, grows freely and without any cultivation in the fields of Mexico; and oxen and horses thrive all over the American continent. There may be some race or races of man to whom these laws do not apply.

Lastly, persistence of race has ever been held as a proof of distinct species. Now, as I long ago pointed out, the monumental and pictorial remains of Egypt shew us distinct races of men at the remote times when these monuments, etc., were erected. When I first wrote, or rather lectured, on the races of man, Lepsius and Horner had not written. The date of these monuments was unknown to me. Perhaps many may say that the date is still a mystery; in the meantime, it is generally admitted that they have an antiquity of many thousand years, and, if this were well ascertained, it carries back the origin of race to a point in history far beyond all historical evidence. So far as I have been able to discover in history, the races of Man have been always distinct; the antagonism—I had almost said the hatred—of race to race has never ceased. To those who talk loudly about colonization and emigration; the peopling the earth with Anglo-Saxons; the transformation of the Red Indian into a Spaniard or a Saxon, a good Christian and a civilized man; to the all-powerful influence of education, etc.; I take leave to point out the result

of the Spanish Commission, sent expressly a few months ago to Mexico, to judge of the existing state of things. Don Pacheco might have summed up the failure of the gigantic experiment in a few words: 1, reduction of the Spanish race to 8,000; half a million of half-castes—atrocious, blood-thirsty ruffians, without principle, living by rapine on the peaceable inhabitants, and ready and willing to sell their country (have such men any country?) to the highest bidder; the remaining millions are composed of pure Indians, as nearly as may be in the original state in which Cortez found them.

Thus ends the last grand experiment for human hybridism on the acclimatization of the European race on the continent of America, a land to which they do not naturally belong. A full-blood Indian is President of Mexico. All this I foretold many years ago. Another experiment is now in progress in the North: this time it is the burly Anglo-Saxon race, in their own estimation the biggest, strongest, best race in the world; the only Christian race; the unsurpassable race; the race destined to repeople the world after the extinction of all the others. They will also in time become extinct on the American continent; and so will the Celt of Canada.* From the character of the Celtic race in Canada I drew the principal features of their colonies all over the world. Thus it will ever be. Nor climate, nor government, nor external circumstances, ever alter race.† They may, and they do affect them, and in time destroy them; but they never give rise to a new race. In half a century, the dreams of Humboldt, of Canning, of Guizot, and other profound statesmen, have come to a close; and nature once more, as I long ago predicted, asserts her rights. The Red Indian is not yet extinct, neither is he civilized. Three hundred years of attempted civilization, education, christianizing, baptizing, have scarcely altered him in the least. So it will happen in New Zealand: the dream of Macaulay, like that of Humboldt and Canning, will never be realized.‡ Humboldt throws out a conjecture—a very

* See their character drawn by me in the Races of Man.

† I entreat M. Quatrefages' attention to the results of the Spanish experiment on the American soil; they completely subvert his theory of the unity of races. Nor has he substantially refuted what I said of the Celtic race in Canada. He says they have increased to about a million, which argues that they do not decay. Be it so. Has the character of the race altered? I find it asserted by a late political author that the population of Lower Canada is half American (States people), and that there is a continual immigration of such persons into the province. Under these circumstances, statistics are of no value. Without any fear of contradiction, I still maintain that the Celt of Canada is still a man of the Louis Quatorze age. That is all I assert.

‡ This dream was a mere transcript of a passage in Gibbon.

probable one—that the present race or races of American Indians may be the descendants of a mixture of Asiatic tribes, and the aborigines of this vast continent; and it is not unlikely also that the figures with enormous aquiline noses observed in the hieroglyphical Mexican paintings preserved at Vienna, Veletri, and Rome, are historical fragments indicating the physiognomy of some races extinct long before Cortez and Pizarro appeared. To this is due, perhaps, the rapid decline of the Carib and Red Indian. (Vol. i, p. 155.)

As with America, so with Australia: the democratic sceptical Anglo-Saxon will here establish his favourite constitution; he will become of course a native Australian, a know-nothing, a true-born Australian, a democrat; he will set up an effete Anglican church, and worship it as children do dolls.* The imposture suits all his views. And now the race already alters in Australia, and in three hundred years they may be extinct.

Conclusion. The various species of Men constitute one great natural family. Each species or race has a certain degree of antagonism to the others, some more, some less. They never mingle; and, should accident cause a commingling, they ultimately separate into their primitive elements. The original history of mankind is as yet unknown. The historian takes no notice, and the scientific man cannot accept of the existing theological systems which attempt to explain his origin. Certain of these systems, unfortunately for them, include in their history of man a cosmogony of the earth and a chronology of man at variance with science and with history. Cuvier refuted the cosmogony, and the paintings and architectural monuments of Egypt refute the chronology.

Throughout this inquiry, frequent allusion has been made to the causes of the extinction and gradual decay of various races of men. The decline or fall of nations it is not so difficult to comprehend; nations are political institutions, which make progress or sink into decrepitude according to the nature of their respective governments; their decline must ever be in the direct ratio of the rigor of the despotism which afflicts them. There is no mystery here; but it is otherwise with races. Much has been said lately of the dying out of savage races in presence of a more highly civilized man; but, after all, there is no mystery in such a case. Deny to any race a free social condition, civil or religious liberty, and the race is sure to perish. But this is not all. The extinction of various forms of life on the globe, and

* Emerson. Professor Smith of Oxford has given the same opinion.

the appearance of others new to the earth, are phenomena in the production of which man plays no conspicuous part. It is a phenomenon in the hands of nature, and may perhaps be partly explained by a reference to some events which have occurred during the historic period. The Lusitanians took possession of the Canary Islands about four hundred years ago. There lived upon these islands a distinct race of men; this race is said to be now extinct, but they were not destroyed by the aggressive race. Were the Guanches a fragment or vestige of a race, whose centre of creation, the land of whose birth had ceased to be? Did they form a part of the fauna of the land, a portion of which now lies beneath the Atlantic ocean, whilst its eastern part is represented by the Sahara? For this seems to be the history of the extinction of races of men and animals; they perish with the land of their origin, or, as Buffon happily expressed it, their centre of creation. Thus have perished many races of animals and of man. The flat-headed race mentioned by Hippocrates as inhabiting the borders of the Euxine, were in all probability the mere remains of a race over whose centre of creation or aboriginal land the Caspian and Euxine now roll their stormy waves. The singular crania discovered some years ago in Central Germany, are probably the remains of some individuals of the race, who had escaped the catastrophe by wandering into Europe. The extraordinary shaped crania occasionally found on the shores of the desert rocky isles of the Pacific, belonged in all probability to the race whose centre of creation now lies buried under that vast ocean.

I shall return to this subject.

On the Unity of the Human Race; viewed as a Physiological and Anatomical Question.

PART 1. It must be well known to all who have carefully studied the works of the most illustrious of all anatomists, the late George Cuvier, that he admitted the fact, though no doubt with some reluctance, that occasionally in the anatomical structures of different species of animals greater differences could not be pointed out, although the species were notoriously and confessedly distinct. Coming within the category, he pointed out the genus equus, or horse; having failed to discover anatomical differences in the skeletons of the various species composing the genus, he was forced to admit that in this instance, at least, anatomy, the grand instrument of all his discoveries, was an unsafe guide, and could not be trusted; was in fact no guide at all. By carefully noting the external characters the

merest savage can and does arrive at that knowledge which the profoundest anatomist in the world could not acquire by the minutest inquiry into the internal structure. Since the time of Cuvier many other facts have been shown, all tending to the same conclusion. The result was this: the bones of an animal, strongly resembling the existing horse, being found in an ancient fossiliferous stratum of the earth, how was the zoologist to arrive at a true inference in respect of these bones? The exterior, the all-important character in zoo-classic was gone, and lost for ever; the skeleton, partial or complete, remains; is it identical, and of the same species as the now existing horse? I lean to the opinion that under such circumstances it was specifically distinct, and belonged to an extinct epoch of living forms; and if so, the coincidence of human bones being found with these implies an inconceivable antiquity of man. On the other hand, all doubt is removed, when by the side of the remains of these doubtful species other vestiges are found, of animals of unquestionable extinct epochs. The specimen, then, in question, was either of the same species as the existing horse, and if so, the present living world intercalated with the past, or if different and distinct, it implied that no dependence could be placed on the anatomical test in palæontology, in so far at least as regarded closely resembling species. For want of correct ideas or of language, or both, we speak of fossil tigers, bears, lions, panthers, as if there ever were such animals, properly so called. They were carnivorous animals; that is all that we know for certain; but as to their resembling the present races of these animals, there are no grounds for such a belief. Thus the whole theory of the restoration of the extinct animal world has always appeared to me to be a delusion, ending in the production of such monsters as we see imitated at the so-called Crystal Palace—monsters, such as never were, and probably never will be found on the earth. Cuvier was very cautious in his outlines of the restoration of the extinct, conscious that by the loss of the external characters all hopes of a correct restoration were frustrated.

As regards man, the question assumes a more important, I had almost said a more serious, aspect. To the various races of men now met with on the earth, the illustrious Blumenbach gave the name of varieties, probably he thought that they are not distinct species, but merely accidental varieties of one species; and this is the view most generally adopted. As there is nothing accidental strictly in this world, these varieties must have a producing cause, and that cause must be physical. Nothing metaphysical can exist, and it is an out-

rage on common sense to give the nonentity a corporeal existence. The varieties of the race or races of men differ more from each other than the horse from the ass; the ass from the zebra, the zebra from the quagga, both internally and externally; yet it has never been maintained that these distinct species of the genus horse all sprung from a common parent. If the theory is to be applied to man, it ought to be shown, first, why it does not apply to the horse; and, secondly, how it happens that man, who boasts of the means which his intelligence devises to enable him to resist all climates, should yet be the animal who seems most of all under the influence of the external media in which he lives. Thirdly. How is it that in tracing backwards in line the pictorial history of man we find that at no period of his history were the races different from what they are now, physically at least? As "*tout le morale est dans la physique*," I feel assured that morally, as well as physically, man is much the same now as he has ever been. In what follows I shall not fail to consider carefully this part of the question.

2. Hippocrates, the father of medicine, held the opinion that the races of men are merely varieties of one species, and that these varieties result from the varying circumstances in which man may be placed. He supported his ingenious and plausible theory by all the knowledge he possessed of the inhabitants of the earth known to him; for be it observed that this amounted to very little. In his celebrated work, *De Aëre, Aquis, et Locis*, he propounded the whole theory of external influences over man, a theory which is much in vogue to this day. It relieves the hesitating and the impatient of many difficulties; has a quasi-philosophic look; has plausibility on its side, and man's superficial observations to support it. But, like Egyptian history, in solving one enigma it unfortunately raises many new ones; and the pleasure derived from perusing the work of Hippocrates and the modern expositors of his views, is a good deal marred by reflecting that the whole theory is antagonistic to historical truth, to physiological observation, to the experience of the present and the past.

The views expounded by Hippocrates seem to have been the same as those of his predecessors. Thus Herodotus asserts that the Persian skulls in his day were soft, and the Egyptian hard; and he assigns a reason for a phenomenon which had no existence.

Men differ more in their intelligence than in their *physique;* to prove this we have only to look at France, Spain, Poland, Russia, and Turkey. Observe the intense Catholicity of the Celtic, Lusitanian, and Italian races; the stubborn Protestantism of the Scandinavian

and German; the different basis on which they place their belief—the one on faith, the other on reason. Lastly, look at their literature, that ultimate test of all civilization, and of the view they take of art, and you will speedily perceive that it is in the nature of the race, and not in any surface varnish a nation may have accidentally acquired, that the different views men take of the external world are to be traced and defined. These intellectual qualities are equally fixed, permanent, and unalterable, and are much more important than the physical characters of the race.

Part II. That some races that once existed have now perished, or nearly so, is by no means improbable. The prime cause of their extinction may have been the destruction of the land of their origin, the centre or focus of their original formation. This theory, I applied to the Phenician race, and to the Basques, which still exist; to the Caribs, and to the progenitors of the Aztecs, whose focus of origin is probably now at the bottom of the Pacific. Their escape to another continent would not necessarily save the race from final extinction. If the cradle, for example, of the Scandinavian race were to disappear beneath the ocean, their colonies might be found unequal to the support of the race through many centuries in the land of their adoption, and thus the whole race might in time disappear.

The scientific man endeavours to ascertain the antiquity of man—1. By historic documents and monumental or other remains of human industry; 2nd. The more indirect manner by efforts to identify his remains with those of animals which have all perished and are therefore presumed to belong to a previous geological period.

Since we cannot discover the producing cause of race, let us trace man backwards in time in order to ascertain—1. If men have always been of the races we now see; 2. If any ancient races have become extinct, or any new ones appeared; 3. Endeavour to ascertain the antiquity of man on the earth.

1. By the discovery of the fossil remains, the immortal Cuvier gave human kind a new reading of living nature: he explained to the world the signification of these remains.* The result of these greatest of all discoveries ever made by man were—1. A refutation of the Hebrew cosmogony; 2. A demonstration of the antiquity of life on the globe, and proofs irrefutable that living animals had changed their forms at certain periods of the world's career. To these periods he gave the name of geological epochs, when new forms of life appeared on the globe, and the older forms became extinct. The present order of

* Mr. Hunter and the Royal Society.

things he thought was comparatively recent; in this epoch, he of course included man. But by pointing out distinctly that man had not been found in any fossiliferous stratum of the globe, his appearance on earth might be quite recent. He avoided all other questions respecting man, his races, his qualities, physical and moral. The fact of man not being found in a fossiliferous state was dexterously seized on by the able Freycinous and the theological world generally, and Cuvier and orthodoxy were easily reconciled. Although his discoveries refuted the Hebrew cosmogony, it did not affect the chronology. The six days were declared to be vast periods in time; what the theologian made of the seventh day, whether a day or a period, I neither know nor care to know. Thus he drew a distinct line between the living and the extinct, the present and the past; his theory of species was disputed by De Blainville; it was denied on philosophic grounds by Goethe and the German school, followed by Geoffroy (St. Hilaire) and others; the English, as usual, came last.* But long before Cuvier's death, geologists had shewn that the distinction he had drawn between the present organic world, including man, and the past, in which it was supposed that man was not present, or to use a theological term, had not been created, was untenable.

More than thirty years ago, M. Knot, in his *Suites de Buffon*,† wrote as follows, and as his works are well known, as they comprise the labours of many distinguished geologists, I feel surprised at some English naturalists affecting unacquaintance with them, and relating M. Knot's remarks as if they were new and of English growth.

"Spallanzani, a distinguished observer of the last century, announced the presence of human bones in strata of vast antiquity. The fact was denied by Cuvier, but has since been distinctly proved. Donati, on the coast of Dalmatia, has done the same. The appearances were re-examined by Germar, who, besides human bones, found portions of pottery." Baron Schönlein, M. Schouter, and Count Sternberg, near Köstritz, made similar observations. Count Razomousky was equally successful near Baden. In the Grand Duchy of Austria, Count Briuna, near Kremz, discovered crania of extraordinary shape, supposed at first to come from the ancient burial places of the Avars, but proved afterwards to have no relation to that people. M. Boué, behind Lahr in the Grand Duchy of Baden, in 1823, made similar discoveries as to the juxtaposition of human bones with the remains

* The author of the Vestiges of Creation; Messrs. Darwin, Huxley, etc.

† It was a mistaken idea that any one could *continue* Buffon; no one could write like Buffon.

of the fossil extinct animals; he showed them to M. Cuvier, who objected to the authenticity of the facts. M. Boué gave way at the time, in presence of the first anatomist and palæontologist in the world, but he revisited the spot in 1829, and verified all the facts. The bones were found in a locality from thirty to fifty feet above the waters of the Schutten.

To these facts have been added other discoveries lately made on the soil of France, and respecting which the Academy of Sciences remained dumb. We allude to the human bones found in the caverns of Beze, of Pondres, of Souvignerques, of Darfort, and Nabigra, to which must be added numerous discoveries of the same kind made by M. Schmerling in various caverns of the province of Liège.

It is to be remarked that the human bones of various localities cited above belong generally to races differing completely from those which live at present in Europe. Thus, the heads found in the sands of Baden near Vienna, resemble in form the African Negro races; those of the borders of the Rhone and of the Danube, offer strong resemblance to the heads of Caraibs, and to those of the ancient inhabitants of Chili and Peru, and were supposed to have belonged to Aztecs imported into Europe by Cortez. To all these facts, which in our opinion merit attention, and encourage the inquiries of geologists, may be added others which no longer permit us to doubt that man was the cotemporary of the last cataclysms, which have ravaged the surface of the globe, and which have accumulated on a number of points animals which still exist, with others which no longer live in the same countries, or which even belong to lost species. (*Geologie*, Knot, p. 430, vol. i, Paris, 1837.)

M. Knot adds: It is, then, only by the aid of doubts more or less *specious*, more or less ingenious, that one can attribute these human bones to deposits posterior to the historic times. Thus was the gauntlet thrown down to the theologists so early as 1837, and the parade of repeating* it without any new facts in 1862, was unnecessary and uncalled for. The peat bogs of Denmark have been referred to as affording proofs of the unfathomable antiquity of man, but the crania discovered at Engis and Neanderthal were not found in these peat bogs, which underlie the ancient extinct forests.

The oldest forest now overthrown was of pine trees; next came oaks, birch, beech, which now cover Denmark. In the beech forests only we found the traces of the men of iron; amongst the oaks, only he men of bronze; amongst the pines, only the men who worked in stone (flint-headed arrows, hatchets, etc.); beneath the peat we

* Lecture at the Royal Institution in 1862.

find no remains of man whatever. In a word, leaving romance and the three forests out of view, human bones have been found in caves in Germany, associated with the bones of mammalians now extinct; and of others that could only have existed under totally different climatic conditions; associated with the bones of the elephas primigenius, the cave bear, the urus, the mammoth, the hyæna, and the hairy rhinoceros, we find those wonderful flint axes, etc. All these facts were submitted to M. Cuvier in 1829, who denied their authenticity, and who would do so now were he alive.

Of the two skulls thus suddenly raised to importance,* one was found by M. Schmerling at Leipzig, in the cave of Engis, in 1833. Can this be the same Schmerling quoted by M. Knot? if so, the discovery is exactly thirty years old. The other skull, known as the Neanderthal skull, was found in a cave in the valley of that name, overlooking the Dussel, a tributary of the Rhine. In whose possession is the skull now?

Conclusion. The conclusion I arrive at is, that mankind forms one great family composed of various species. How these species originated we know not, and may never know. Man does not stand alone; but forms a portion of a serial of which many would have been lost, but which may be recovered by palæontological research. Some years ago (1821) I was conversing with M. Cuvier in his private library attached to the Museum, when an assistant of the Museum brought him a specimen of a fossil but just received. He gazed at it for a few moments with profound attention, and seemed lost in thought. On remarking to him that I was not aware that the fossil remains of animals placed so high in the scale by naturalists, had ever been found, before the specimen in his hand in a fossiliferous stratum of the earth, he observed to me that the specimen before us was the first, but *would not be the last; still higher were sure to come.* And so they have come; the quadrumana, as they are incorrectly named, have been since found in abundance in strata of great antiquity, to be followed, no doubt, by man himself.

And now, if we put faith in the researches of Bone, Knot, Donati, and others, fossil man has been found, or at least human remains in localities implying that the men to whom these remains belonged

* The idea promulgated lately, that in human civilization there were a stone, bronze, and iron epoch or periods (*Lancet*, Feb. 16, 1862), has no real foundation in facts. The three forests (the author seems fond of the number three; numbers strike the imagination of a popular class)—the three forests were found in Denmark buried under the soil, offer no new facts as to the antiquity of man on the globe.

were coeval with those animals we call fossil and which are at all events, now extinct. They belonged then to a prior geological epoch —an epoch past and gone. The centres of creation which gave them birth no longer exist, and other seas, continents, and islands, usurp their place. Most of their animal and vegetable products have perished with them; the cataclysm might be sudden or slow, but progressive, and sure to end in one way, namely, the extinction of the forms of life appertaining to that centre of creation. When slow, it might, and no doubt did happen, that some portions of the fauna and flora did escape immediate destruction by finding a refuge on islands and other lands beyond the range of the catastrophe; but as the external circumstances, summed up by Hippocrates under the terms of "earth, air, and waters," were different and hostile to that form of life, so the remains of these forms of life gradually and slowly but surely perish. When the Spaniards first discovered the Canary isles, they found them in possession of a race of men quite distinct from all others. They had a civilization of their own, and certain usages slightly approaching the ancient Egyptians'. Whence came these people, and how was it that they remained isolated, as it were, from the rest of mankind? The theory to explain the phenomena I long ago proposed and now repeat, was this:—The centre of creation to which the Guanches belonged, and of which they formed a part, no longer exists; it formed a zone or belt across the African continent, extending westward into the Atlantic and eastward across Egypt and the Red Sea into the Indian Ocean; the seas now cover a large portion of that zone, and the desert of Zahara represents another part which, after having been submerged, has again risen from beneath the waves. The Guanches, then, were a race affiliated to that whose architectural remains still astonish the world—the Copt. The same theory seems to me applicable to the Aztecs and the supposed aborigines of the American continent. They were not the aborigines, but races belonging to other centres of creation, and would have perished in time had no European ever set foot on the continent. It applies also to the Maori of New Zealand, to the Tasmanian and Australian, to the natives of the Andaman isles, to the Basques, the Phœnicians, and no doubt to many others.

Neither climate, nor accidental deviation from the normal structure, nor hybridity, seems equal to the production of various races, unless we assume an antiquity to man including one or more geological epochs. Now this, by far the most probable, view remains yet to be proved. My firm belief is and always has been, that the proofs will some day be found. What we call the history of man is a mere delusion—a mere

speck when compared with the pre-historic period. That man has lived through many great changes on the surface of the earth is not a theory of the present day; the opinion seems to have been held by philosophic observers of an early age. Thus, Mohamed—born Mohamed Kaswini, of a race, as his name implies, by no means remarkable for a tendency to scientific pursuits, thus expresses himself. Mohamed seems to have lived in the seventh age of the Hegira, *i. e.*, towards the close of the thirteenth of our era. He wrote a book on the wonders of nature, and in it he thus expresses himself.

"In passing one day by a very ancient and extremely populous city, I asked of one of the inhabitants 'who founded their city?' He replied to me, 'I know not, and our ancestors knew no more than we do on this point.' *Five hundred years afterwards,* passing by the same place, I could not perceive a trace of the city. Inquiring of one of the peasants about the place, 'when it was that the city was destroyed;' he answered me, 'what an odd question you put to me, this country has never been otherwise than as you see it now.' I returned there after another five hundred years, and I found in the place of the country I had seen—a sea. I now asked of the fishermen, 'how long it was since their country became a sea,' and he replied, 'that a person like me ought to know that it had always been a sea.' I returned again after five hundred years; the sea had disappeared and it was now dry land; no one knew what had become of the sea, or if such a thing had ever existed. Finally, I returned once more after another five hundred years, and I again found a flourishing city. The people told me that the origin of their city was lost in the night of time."

These are some of the revolutions to which the living world has been in all times exposed; it is almost needless to say, that they depend on physical and material causes, and are the natural effects of influences set in motion by the inherent qualities of matter.

ON THE APPLICATION OF THE ANATOMICAL METHOD TO THE DISCRIMINATION OF SPECIES.

By the late R. KNOX, M.D., F.R.S.E.

(*From the Medical Times and Gazette, March 14th,* 1863.)

The discovery of true descriptive anatomy, and its application to all classes of the zoological kingdom, led the illustrious Cuvier to the discovery of the fossil world. Many distinguished observers had

previously, no doubt, made some happy conjectures respecting the antiquity of the fossil world, and the advantages to be derived from the application of the anatomical method in the discrimination of species. Daubenton, Vicq d'Azyr, and Pinel, in France; Pallas, Blumenbach, and others, in Germany; Hunter, in England, had long prior to the era of Cuvier discovered and appreciated the utility of anatomical inquiry in zoology; but the credit of having placed this method on a new basis, and of having demonstrated by its means the true nature of the fossil world, belongs, unquestionably, to Cuvier. As many observations and hypotheses have been ascribed erroneously to this illustrious man, and more especially in England, it seems best to ascertain in the first place his own opinions of the value of the method he had discovered.

In the fossil world, those external characters by which an animal species is at once discriminated from all others, had been, with but few exception, wholly destroyed. I allude more especially to the animals we call mammals; and thus, if the species of these fossil animals were to be discovered at all, it could only be done through their osteological remains, including the teeth. The plan succeeded admirably, and led to the most astounding discoveries by Cuvier. As was to be expected, it threw the Linnean method into the shade, and all but extinguished the reputation of the greatest naturalist of any age, the Count de Buffon. It led Cuvier imperceptibly, and seemingly, without his being aware of it, to the adoption of some theories or hypotheses still maintained in England, but abandoned everywhere else. One of these was the attempt to prove distinct epochs of zoological formations, called in this country "creations," a word never used by Cuvier. As a strictly scientific man, he strenuously opposed the philosophical ideas of Goethe and his school, declaring them to be pantheistic, and not scientific; he denied an animal series, and refused to intercalate the extinct with the living world. Species he held to be unchangeable, under every circumstance, and, drawing his proofs from monumental and written records, he showed that the living animal kingdom had remained unaltered since the earliest historic period. To man and to the now living world he ascribed a late origin, as compared with the fossil and extinct. Shortly before his death his theory of the fixity of species was called in question by Goethe and Geoffroy St. Hilaire; the animal serial was demonstrated by De Blainville, and the fossil intercalated with the living world; the metamorphosis of forms was proved, beyond all dispute, by embryogeny, and the philosophic and transcendental

theories of Goethe came to be accepted for scientific truths, and embryonic forms were supposed to pourtray the extinct or fossil world. But even Cuvier himself was aware that anatomical characters could not in every instance characterize species; and he instanced the genus *Equus*, or natural family of the horse, whose species cannot be distinguished from each other by the anatomical method; he might have mentioned many others. How is it with the natural family of man—with mankind?

As most natural zoological families show affiliations with other families, and do not stand alone, it seems proper to inquire, in the first instance, into the relation of mankind with other kinds, that is, other families of animals. Notwithstanding a tolerably strong resemblance between man and the animals usually, but erroneously, as I think, called quadrumana, or four-handed, there is a sharply-defined and deep gulf between these two great natural families. They differ remarkably in their external characters, and equally so in their osteological; and, although it be true that the brain in these two classes is almost identical in its forms, and that the retina in the apes of the old continent, has the foramen of Soemmering, a structure, perhaps, peculiar to man, there is yet enough to show that it requires many natural families to bridge over the gulf which exists beween them, or, in other words, to fill up the serial. Now, the researches of De Blainville lead us to conjecture, with every show of probability, that the wanting links will be supplied herafter—1. By palæontological discoveries of animals lower than man, yet above the apes;* or, 2. By the formation of other species in the course of time, when the existing order of things shall have passed away, following the fate of all its predecessors.

The determination of distinct species in mankind can be made only on the same principles we employ in determining species in other natural families. The characters are either external or anatomical. We have seen that the anatomical method failed in Cuvier's hands when applied to the natural family *Equus*, and De Blainville showed that it also failed in many other instances. Should it fail when applied to man, I shall not be in the least surprised; for, although it be certain, as I think, that the internal structures differ essentially in every species from all others, yet it is obvious that such differences are

* The most modern examples of fossil anthropoid ape with which we are acquainted are the *Dryopithecus* and *Pliopithecus* of the Miocene, probably allied to the existing *Hylobates*. The forms which are discovered in the newer or Pliocene beds are allied to the *Semnopitheci* and *Macaci* of India. Borneo and the Gaboon have not yet been geologically surveyed. (Ed. Anthropo. Review.)

not sufficiently strong to be readily recognized, and therefore, are of little value to the zoologist, and of no importance to mankind generally, who ever have, and ever must look to the exterior alone. Thus, Blumenbach was wrong, as I think, when he attached so much importance to the configuration of the human cranium, thus inducing many persons to suppose that a distinctness of species was only to be determined by constant specific differences in the form of that section of the skeleton. That such differences exist I believe; but even if they did not, this were no argument against the specific differences in the races of man, for it is to the external characters mainly that we must look for specific distinctions. Supposing the Jewish race to have become extinct, and no monumental or other artistic productions have recorded their physiognomy; who, from their osteological remains, could have described the race, or guessed at those physical and moral characteristics which distinguish them in so marked a manner from all other races?

The skeleton of the head, usually spoken of as the skull or cranium, encloses and protects the encephalon. It has relations externally with powerful muscles, and its inner table is in harmony with the external surface of the encephalon. The capacity of the cranium, properly so-called, may generally be assumed to be the measure of the encephalon, to which, however, even in mammals, there is one exception—certain cetacea. Besides providing cavities for the protection of certain organs of sense, it articulates with the vertebral column, of which it seems but the continuation. Goethe first used the expression "cranial vertebræ,"* and its correctness is now all but universally admitted. Between its tables we find osseous cavities, with prolongations into them of the mucous membranes of the nose and pharynx; the uses of these sinuses are absolutely unknown.† They are also wanting in the cetacea.

Now, when we look at the form of the skeleton of the head in the various races of men, it is easy to observe that they differ remarkably from each other, not so much in the capacity of the cranium, as in the shape or configuration of the skull and face, and in the relations of the face to the cranium, differences still more remarkable during

* This expression was rather used first by Lorenz Oken, in 1806, who, speaking of a deer's skull which he had found in the forest, exclaimed "Es ist eine wirbelsaeule!" (it is a vertebral column.) Goethe's memoir, claiming the right to the discovery, after it had been successfully established in Europe, was not published till 1820, a fact which the recent publication of posthumously issued letters, of doubtful authenticity, does not overthrow. (Ed. Anthropo. Review.)

† Dr. Knox always denied the generalization that the absence of the frontal sinus was a constant character of the Papuan race. (Ed. Anthropo. Review.)

life. This difference in form was first observed by Hippocrates, and ascribed by him to artificial pressure of the head of the child, which practice being continued for some generations, the malformations, at last, became hereditary. But the artificially deformed feet of Chinese women have never become hereditary. So that the theory of Hippocrates seems, at least, extremely doubtful. Blumenbach himself doubted if these differences in the configuration of the human skull were constant; the candid Prichard denied that they were, and he has been followed lately by others—Williamson, Owen, etc. In respect of the capacity of the cranium, Dr. Tiedemann fancied that he had found in my own museum several crania of African Negroes quite as large and as finely proportioned as the highest of the white races. Out of the exceptions he established a law, and in this he has been followed by others. But if such variations in form were frequent and permanent, the race would in a century or two become entirely altered: now this, we know, never has happened. Such varieties extend only to a generation or two, and then cease, the primordial forms returning—those forms, namely, which are in unison with nature's great scheme and with the existing order of things. Not that there is or can be any selection, as Mr. Darwin expresses it, Nature is not an intelligent being, and, therefore, there can be no selection, properly speaking. Again, if varieties in any one race were numerous and frequently occurring, this circumstance surely ought to have told upon races favourably situated in other respects; yet, in so far as I can perceive, in examining the monumental records of Egypt, the Copt and Negro have remained unaltered for at least six thousand years. The same law seems to hold good with other races so long as they do not abandon their aboriginal land. When this happens, they perish.

The exceptions so much dwelt on by Prichard, Williamson, Owen, and others, have been greatly exaggerated. They have no influence over the exterior, and probably none over the intellectual qualities of the race; whilst against the hereditary extension of these varieties stands the physiological law of non-vitality and extinction. Many years ago I remarked that varieties in the distribution of the arteries, implying other varieties in structure, were much more common in the very young than in the adult, implying, as I thought, a want of vitality or of viability in these individuals. Thus, nature checks the extension of all important varieties in structure, the individuals being either non-viable or non-productive. This accidental approximation of the individuals of any race to another seems wholly to be without any real results, otherwise hybrids, amongst such, might be fertile.

Now, as I asserted long ago, they never are; and, lately, M. Boudin placed before the scientific bodies of France incontestable proofs of the correctness of my views on this point.

A conformation of the osteological head distinct from all other races characterizes the Australian and Tasmanian, the Esquimaux, the Bosjesman, the Kaffir, the Negro, the pure Mongol, the Carib, the Peruvian: all these races have race characters more or less marked, and not to be observed in other races. That these races may be converted by education into white men is, I fear, an entire delusion.

The situation of the foramen magnum of the occipital bone* is still a matter of dispute. Dr. Prichard thought it to be "the same in the Negro as in the European;" and so it may be, if no allowance be made for the face. The situation of the foramen magnum of the occipital bone is not the same in the Negro as in the European. Dr. Prichard says it is exactly behind the transverse lines, bisecting the antero-posterior diameter of the base of the cranium. Supposing this measurement to be correct, which it is not, it has nothing to do with the *pose* or position of the head upon the vertebral column, which, all must know, depends on the position of the condyles of the occipital bone. A line bisecting the antero-posterior diameter of the skull, and dividing into two equal parts, passes in the European head through the centre of the condyles of the occipital bone; and the same measurement applies nearly to the antero-posterior diameter of the entire head. Not so in the coloured races. In speaking of the base of the cranium, I am not quite sure to which Prichard and his followers allude; for very generally in anatomical works the base of the skull, including the upper jaw, is confounded with the true base of the skull.

Now, as regards other measurements. The diameter of the cranium, measured with callipers, between the fronto-parietal sutures and midway between the vertex and the base of the skull, will be found, on an average, to be less by nearly an inch in the dark races than it is in the European. This seems to me an extraordinary difference in the capacity of that portion of the brain which all fancy to be the region of the higher intellectual qualities—of calculation, of comparison, and of reflection.

It is admitted by Mr. Williamson, that in the German the frontal diameter was five inches; in the French, Spanish, and English, 4·5;

* See for accurate information on this subject, Crull's excellent work, "Dissertatio anthropologico-medica, de Cranio, ejusque ad faciem ratione", 8vo, Gröningen, 1810. The *angle* of the occipital foramen to that of the line formed by the basioccipital bone, is the one which we are in the habit of using. (Ed. Anthropo. Review.)

in the dark races as low as 3·6 and 3·7. This is all I contend for. The measurements of the occipito-frontal arch, inter-mastoid, etc., are of no value. The length of the head and face (skeleton of the head) is a true natural motory character, and strongly characterizes the fair from the dark races; but the mingling up the two segments of the head leads to confusion and to erroneous inferences. The cranium being divided into two parts by a line (which I presume was perpendicular) drawn from the anterior edge of the foramen magnum occipitale to the centre of ossification of the parietal bones, so as to divide the interior into two chambers, an anterior and a posterior, the respective capacities of these chambers were next ascertained. The results gave—

Anterior Chamber.

German	51
English	43
Esquimaux	40
American Indian	32
Tasmanian	32

The numbers speak for themselves.

The remark, that in some crania the ring of the sphenoid does not reach the parietal on one side, was first made by me. I do not attach much importance to it, excepting as tending to illustrate the history of retrogressive development.

Mr. Williamson remarks "that the position of the foramen magnum occipitale was found to be exactly behind the transverse lines bisecting the antero-posterior diameter of the base of the cranium, which is the position in European skulls. The situation of the foramen magnum is, therefore, the same in Negro as in European skulls."—Page 24.

But these measurements, admitting them to be correct, which they are not, do not touch the real question at issue, which is the position of the Negro head on the vertebral column, as compared with that of the European. Had the measurements been made through the centres of the condyles of the occipital bone, the results would have been very different.

In a report on a collection of skulls of various tribes of men inhabiting Nepâl, collected and presented to the British Museum by Mr. Hodgson, late resident in Nepâl, Mr. Owen expresses an opinion "that it is only with regard to the Australian and Tasmanian aborigines that he could feel any confidence in detecting the distinctive characters of a race; that, in fact, Negro-shaped skulls occur amongst

all races; that the white races have no advantage in this respect over the dark-coloured races."

Now, German and Russian travellers have made similar remarks in respect of the inhabitants of the Caucasus; and I was informed by my esteemed friend, Dr. John Sutherland (of the War Office), that whilst travelling in the Tyrol he found numerous specimens of those models of beauty whose portraits have been placed on canvass by the early Italian painters—women with beautiful oval Greek face and head, combined with fair hair and blue eyes—figures, in short, not to be seen in any Italian race. In troublesome times, nations and races, out of which nations are formed, flee to the mountains, where their descendants long find protection. The country of Nepâl describes in some respects the regions to which I have alluded.

Nepâl is in a long and narrow tract of land, bounded to the north by the great mountain-wall of the Himalayas, separating it from Thibet; to the south, extending into the plains, bounded there by Delhi, Oude, Bengal, etc., and extending to the Chinese frontier. Situated between 27° and 31° north latitude, it is extremely varied in climate, and presents numerous narrow valleys of great altitude. It has been long known that the numerous valleys are inhabited by a variety of mixed races, which cannot be traced to their origin. The aborigines were probably Tartars or Chinese; they were invaded by the Hindoos about, probably, the fourteenth century; then came the Mohammedan sovereigns of Delhi; the inhabitants fled to the mountains.

All this has been carefully described by Dr. Latham in his admirable work on *Descriptive Ethnology*. A small population thus tossed between two, or rather three, overpowering foreign empires, cannot be expected to show the characteristic forms of a purely primitive aboriginal race. In addition to these circumstances connected with Hindoo, Mongol, Chinese, and Arab conquests, must also be taken into account the peculiar social habits of the Nairs—habits the reverse of those of the western world, and of all other races known to me.

ON THE DEFORMATIONS OF THE HUMAN CRANIUM, SUPPOSED TO BE PRODUCED BY MECHANICAL MEANS.

By the late R. KNOX, M.D., F.R.S.E.

History informs us that in very ancient times a belief prevailed that by mechanical means applied to the head of the infant, another form might be given to it than that intended by nature. Hippocrates was the first, I believe, who mentions the circumstance, ascribing the practice to certain people who resided near the shores of the Euxine. Like a true professor of the conjectural art, he added theory to the fact (if it really was one), that at first the deformity produced by art required to be practised on each individual child; but that afterwards, the deformity having become hereditary, the mechanical means were no longer required. It is needless for me to remark that artificial deformations never become hereditary, and, therefore, the theory of Hippocrates falls to the ground. But the facts still remain, that is, admitting them to be facts, for there are two, not one. The first is, did there live by the shores of the Euxine a race of men with deformed heads (the Macrocephali)? Secondly, were these deformations produced by mechanical means, or were they mere exaggerations of a peculiarly-shaped skull, to which mechanical pressure might give a more distinctly marked character? I lean to the opinion that such a race existed, more especially since crania have been found near Kertch, in the Crimea, presenting well-marked deformations. So far as I can learn from the reports, they were a flat-headed race, with depressed foreheads and skulls, which bulged out tolerably, and in this resembled the Chenooks and Caribs of modern times. What gives a peculiar interest to the remarks of Hippocrates, and to the discovery of deformed crania at Kertch, is the finding similar crania in Germany associated with palæontological remains of great antiquity. Thus, a flat-headed race seems to have extended in ancient times from the shores of the Euxine, probably not a sea at that time, to the centre of Europe, coeval with races of animals which are now extinct, like the flat-headed race of men themselves. With the area or centre of their creation, the Fauna and Flora of the region have disappeared, and new forms of life, including new races of men, have taken their place; not new creations, but new forms of men and

animals, adapted to, viable and reproductive in, the media surrounding them. Perhaps the most remarkable of these deformed, flat-headed crania was found in a cave at Engis, near Luthik, in Germany,* and geologists do not hesitate to ascribe it to an antiquity equal, at least, to the extinct fossils of the formation. Another cranium was found at Neanderthal, between Dusseldorf and Elberfeld, perhaps quite as old as that from the cave of Engis. I do not think them much more deformed than some crania I have seen picked up on the shores of desert islands in the Pacific Ocean, one of which was in my own museum. They have a certain resemblance to the chimpanzee, but not to the gorilla. It is stated also that the limb bones are thicker and broader than those of the present races of men, implying that they retained to their adult condition certain fœtal peculiarities. These facts rest on the authority of Professor Schaaffhausen, of Bonn, and may, no doubt, be entirely depended on. A race of men coeval with that period, having round crania, resembling those of the present Lapps, but with a prominent ridge over the eyes, has been described by Lartet; and Danish naturalists speak of a race of Molluscophagi; but I have not seen their observations, nor Mr. Lubbock's memoir. They do not, however, belong to the class of deformed skulls, whether by mechanical means or otherwise.

In other regions we find deformed crania, showing that such were by no means confined to the regions I speak of. The Chenook skull has been often described; also the Carib. These are skulls which seem as if they were flattened from before backwards; such also was the case with the Aztec. In his remarks upon the deformed crania of Central America, Mexico, and Peru, M. d'Orbigny has the following observations:—"No head is to be found amongst the present Aymaras. They have the same form of head as the Quichuas, comparable to the flattened skulls of their ancestors, seen in tombs in the lake of Titicaca, in those of the province of Muñecos, in the wildest part of Carangas, and in the valleys of Tacna. What proves, if any proof were wanting, that this deformity is owing to a mechanical process, and is not a part of the natural structure of the race, is the fact that in the same tombs, together with the depressed skulls, others are found of a very different shape."—P. 470, "Prichard." In this conclusion I do not agree; the fact merely shows that two distinct races occupied the same country. On the other hand, the

* No evidence of artificial compression appears to us to be present in the Engis skull; and so far from its being flat-headed, the skull exhibits a remarkably even contour. (Ed. Anthropo. Review.)

Peruvian skulls I have examined in this country seem to me to present a quite different deformity than that now spoken of. It consists in a highly irregular-shaped cranium, combined with a remarkable want of symmetry, and this extends to and includes the bones of the face. I have observed this to be all but constantly present in Peruvian skulls, whether ancient or modern.* Could we accept *en totalité* the views of the excellent Prescott, on the civilization of the ancient Peruvians and Mexicans, we should feel inclined to arrive at the conclusion, that the shape of the cranium, and, by inference, of the brain, has no influence over human civilization; but against this view there exists a mass of evidence which cannot be readily set aside, even admitting the view I adopt to be the correct one, namely, that all or most races are quite equal to the invention of all the social arts, which, originating in necessity, clearly follow the exigencies of each race. But such inventions are no proofs of the capability of the race for that high civilization which embraces not only the social, but the emulative or fine arts, including an ennobled literature, profound science, an abstract philosophy, as was first distinctly placed before mankind by the antique Greeks.

The questions discussed in this memoir naturally lead to others, such as the origin of species, the antiquity of man on the earth, and the development of all living forms from a primitive, original, living molecule—in a word, to the philosophy of zoology, or the system of nature. Prior to Cuvier's great discovery no true philosophy of zoology could ever be imagined; the system most in vogue at present was invented by Goethe; it belongs wholly to him, and probably could not have originated with any other race than that to which he belonged—the race which produced Leibnitz and Kant, Gall and Wolff, Niebuhr and Schelling. Translated into English it has assumed a very plain and practical character, and has even been mistaken for science. But philosophical speculation is not science, nor did Goethe ever mistake the one for the other.

* D'Orbigny's observations on the whole subject are very confused. The skulls which we term "Quichua" are the so-called "Inca" skulls from Pachacamac, and are essentially short-headed (brachycephalic), exhibiting a cranial type wholly distinct from the extinct long-headed races of Lake Titicaca. Whether those latter races were the ancestors of the existing Aymarás is entirely a different question, and one to which the state of our knowledge precludes as yet any definite answer. (Ed. Anthropo. Review.)

REVIEW OF THE PROCEEDINGS OF THE ANTHROPOLOGICAL SOCIETY OF PARIS.*

By M. PAUL BROCA, Secretary General;
HONORARY FELLOW OF THE ANTHROPOLOGICAL SOCIETY OF LONDON.

Delivered June 4th, 1863.

Gentlemen,—Called upon to address you on this solemn occasion, when the Anthropological Society, after an existence of four years, celebrates, for the first time, the anniversary of its foundation, I purpose to retrace the history of your labours, to show what you have done for the progress of our science, and the great and legitimate part you have taken in the promotion of ideas and studies, which have been too long neglected.

Anthropology, as you conceive and cultivate it, is the youngest of all sciences; and we may well feel surprised at its late birth. Is there among subjects accessible to scientific investigations, one which can compare in interest or importance with the science which attracts you to this hall?

Would it not appear that man, before inquiring into the objects which surround him, should rather follow the precept of the wisest of Greeks, and endeavour to know himself? But humanity in its evolution resembles the child, which at first careless of his own being, is only curious in regard to surrounding phenomena; and who, at a later period, proud though ingenuous, more attentive to external objects than to the process of his thoughts, admires himself, without taking the trouble of self-observation, and remaining in ignorance of his own self, perceives, when he arrives at adult age, that he has seen, scrutinized, and analyzed every thing except his own nature. Such, and slower still, is the progress of knowledge in humanity, which has studied everything excepting itself.

As humanity had, even before the commencement of civilization, lost the remembrance of her humble origin, and found herself already at the first dawn of the sciences, the queen and mistress of this planet, she was apt to believe that she was born in all her force and splendour; that the earth was her patrimony and not her conquest;

* Having been favoured with a copy of M. Broca's admirable address, we have much pleasure in inserting a translation of it *in extenso*, though we are from its length compelled to omit several interesting articles intended for this number. Editor.

that the three kingdoms of nature had only been created for her service and pleasure: the stars to furnish her with light; the days and nights to divide her time; and the seasons to secure her harvests;—in one word, she was apt to believe that the universe had only been created for her; and so long as she conserved that illusion, she feared to disgrace and to lower herself to the level of brutes, by submitting to description, classification, and to the methods of investigation of natural history.

It was only in the last century that, guided by a sounder philosophy, men of science ventured to take up anthropological studies. Whilst Linnæus assigned to man a place in his zoological classification, Buffon wrote his *Natural History of Man*, and the first monument of our science became one of the masterpieces of our literature. But we should in vain, in these immortal pages, look for the precise and rigorous facts which we now exact. Though Buffon describes, as well as it was then possible, the physical characters of peoples, and the varieties of form, stature, and colour which distinguish them, still he was, from the want of sufficient authorities, unable to group and classify these varieties, and to arrive at a proper notion of *race*. This was the work of Blumenbach, who, with more ample means of information and taking the new science of craniology as a basis, established in the *genus homo* methodical divisions, and gave, for the first time, that, without which no science can be established, viz., a nomenclature. Buffon had laid the foundations of a *Natural History of Man*, and of *Ethnography*, or description of peoples; Blumenbach laid down the basis of *Ethnology*, or the science of races.

The distinction of races being admitted, an immense field for investigation opened at once. It was not merely requisite to complete or to rectify the classification and the descriptions of Blumenbach, but to inquire into the origin of permanent varieties, hereditary types,—characters so diversified, and yet so graduated, which distinguish the races. For this purpose, it was first necessary to study the influence of external conditions, such as climate, alimentation, mode of life, etc., on the human organism; to inquire how far these different agents were capable of modifying the individual or the race; and within what limits the laws of heredity and atavism maintained these varieties. It was then requisite to determine the filiation of the peoples, to trace the course of their migrations and intermixture, to interrogate their monuments, history, and traditions; to follow them up beyond the historical period, so as to arrive at

their cradle. All these were entirely new questions and new problems, which until then had not been put to science; and these multiplied and unlimited investigations, which require the simultaneous concurrence of zoology, anatomy, physiology, philology, and palæontology, must converge to constitute the science of man, or anthropology.

Such is the mission bequeathed by the eighteenth century to our own. But who, sixty years ago, would have tried to carry out this programme would have spent his life in useless efforts. The hour had not yet arrived; before grouping the sciences they must have been acquired; and some of those tributary to anthropology were not sufficiently advanced to furnish it with a fulcrum. Comparative philology just made its *débût;* archæology had as yet not extended its domain beyond the limits of Western Europe; and palæontology and geology, these twin sisters, were as yet scarcely able to walk. All the ages which preceded the historical period were thus inaccessible to the student, and classical history itself, which criticism had not yet purged, nor a free examination emancipated from the theological yoke,—this history itself confined the past of humanity within a factitious frame, in a restrictive chronology; a modern bed of Procrustes, in which the most important facts regarding the life of primitive peoples could only be admitted, shortened and mutilated.

To found anthropology upon its veritable basis was then impossible, and we cannot but admire the prodigious intellectual movement which within half a century has prepared the soil upon which we now build. Never had human knowledge grown so much within so short a period. At no time had the spirit of inquiry displayed itself with such might, in every direction. The impassible Egyptian sphynx has revealed his mysteries; the antiquities of America, these patents of nobility of a world which we cannot any more call new, have displayed before our eyes unexpected marvels; and Nineveh and Babylon, exhumed from their coffins, now speak again. The superficial strata of our planet, perseveringly interrogated, have opened like the pages of a book, where the three kingdoms of nature have their archives, where every species before disappearing left its mark; where man himself, so late in coming, has yet left the proofs of his antique existence; and the pages of this immense book tell the history of innumerable beings, which from epoch to epoch, like the runners in the circus, successively transmitted to each other the torch of life—

"Et, quasi cursores, vitai lampada tradunt." (Lucr. ii, 79.)

Whilst archæologists and palæontologists reanimated the material

remains of the past, other scholars ascended the chain of centuries by a different road; they resuscitated the dead languages, and recovered in these immaterial organisms, in these fossils of human thought, the pre-historic annals of the peoples; the proofs of their forgotten migrations, of their unknown filiations, the *débris* of their first creeds, and the impress of the various phases of their intellectual, industrial, and social evolution.

In this incomparable half century, which has seen so many discoveries, which has explained so many enigmas, which has transmitted to us precious documents, as to the past of humanity; the study of human races has become enriched with an enormous mass of facts. Africa, always inhospitable, has ceased to be impenetrable; the Australian continent has been explored; European ships carry our seamen or missionaries, and our philosophers to every coast.

Nearly all the peoples on the globe have been observed, described, represented in pictures, studied in their manners, industry, language, religion, and traditions; our museums have received their remains; and casts, skulls, and skeletons, brought from all parts of the globe, have rendered the study of the most distant races accessible to the sedentary philosopher.

Each has in his own way profited by this rich harvest. Some, the pure naturalists, exclusively occupied with the zoological question, have tried to correct and complete the classification of human races; others, still more special, have concentrated their attention on craniology, and have made this science, founded by Blumenbach and Camper, the basis of anthropological studies. Others, finally, ignoring the proceedings of natural history and anatomy, have subordinated the physical characters of races, and have given the preference to the characters drawn from comparative philology. These isolated researches in the various branches of the science of man, have, no doubt, been fruitful. Many particular questions have been better fathomed by being treated exclusively, and the number of demonstrated facts was considerably increased thereby; but this was not sufficient for the formation of a fascicle of methodically connected branches, which alone in the present day can constitute a science. The various branches of anthropology were already in existence, but anthropology itself, towards which they were to converge, did not yet exist, and to give it organization and life, more was required than individual efforts. Where was the mind universal enough to embrace so many branches of knowledge, and capable of co-ordinating them? The combined genius of Aristotle, Haller, and Humboldt, would not have

sufficed. That vivifying principle of our epoch, even more fertile in the field of intelligence than in that of material progress, association alone, can attain this object, and it is for this purpose, gentlemen, that the Anthropological Society has been formed.

We cannot, certainly, flatter ourselves to have been the first who perceived the necessity of uniting into a single bundle all the branches of anthropology, nor of having first attempted it. Many others before us have traced out such a programme with varied success. M. Boudin, our last year's president, in his inaugural address, acquainted you with the manifesto of the "Society of the observers of Man," which was founded in Paris at the beginning of this century, upon principles differing but little from ours, but which, as it was before its time, could not definitively be constituted.

In England, the learned Prichard, that indefatigable inquirer whose glory nearly equals that of Blumenbach, devoted his long life and his eminent faculties to the composition and publication of a great, and still unrivalled work, in which natural history, ethnography, and philology mutually support each other. In France, the illustrious William Edwards, who opened a new path by studying for the first time *the physiological characters of human races considered in their relation to history*, founded in 1839—a memorable date—a society whose name and remembrance will not perish—"the Ethnological Society." To study at the same time "the organization of human races, their intellectual and moral character, their languages and historical traditions, so as to constitute upon these veritable bases the science of ethnology," was the object of this society which prospered for several years, and whose remarkable labours have exercised so striking an influence on the evolution of anthropology. Foreign philosophers soon became anxious to follow our example. *The Ethnological Society of London*, and the *Ethnological Society of New York*, were organized on the same plan, in the same spirit, and on the same programme as that of Paris.

But this programme, gentlemen, was not yet complete; it was that of ethnology or the science of human races, and not that of anthropology or the science of man. To describe and classify the actual races, to point out their analogies and differences, to study their aptitudes and manners, to determine their filiation by blood and language, is no doubt to run over much ground in the field of anthropology; but there remain higher and more general questions. All the human races, in spite of their diversity, form a great whole, a great harmonic group, and it is important to examine the group in its *en-*

semble, to determine its position in the series of beings, its relations with other groups of nature, its common characters, whether in the anatomical and physiological, or in the intellectual order. It is not less necessary to study the laws which preside in maintaining or changing these characters, to appreciate the action of external conditions, the changes of climate, the phenomena of hereditary transmission, and the extreme influences of consanguinity and ethnic intermixtures; these are great and manifold questions within the sphere of natural history and general biology. Finally, in a more elevated sphere, and without venturing to attain the regions which conceal the problem of origin (a fascinating and, perhaps, insoluble problem), our science eagerly searches for the first traces of man's appearance on the earth, it studies the most ancient remains of his industry, and gradually descending from incalculably remote epochs towards the historical period, it follows humanity in its slow evolution, in the successive stages of its progress, in its inventions, in its struggles with the organic world, and its conquests over nature.

Ethnology, is then, only a part of the science of man; the other part is "general anthropology," which has occupied so large a place in your labours. It is by this, gentlemen, that our society is distinguished from those which preceded it, and it is for this reason that it has adopted the name of the *Anthropological Society.* Here again, the example set by France was not long in being followed by foreign philosophers. It is scarcely four years that we have entered this path, and already have we seen arise in Germany, the *Anthropological Congress,* founded by Professors Wagner and de Baer; in England there was, a few months since, founded the *Anthropological Society of London,* under the presidency of our eminent colleague Dr. James Hunt. And I entertain the conviction that the successors of Morton will find it necessary to organize in the United States an Anthropological Society, as soon as the civil war which desolates their country shall cease. Henceforth general anthropology and ethnology form but one science,—the most noble of all sciences, since it has for its object humanity, considered not only in itself but in its relations to the rest of nature.

I thought it my duty, gentlemen, to cast a rapid glance on the principal phases through which the science of man has passed up to our time and to point out the mode in which you have conceived it, in order better to show the impulse you have given to it. I wished first to expose the object and the plan of your labours; for the success of an undertaking depends above all on the solidity of its foundations.

But it no less depends on the perseverance and activity of those who devote themselves to the task; I shall, therefore, endeavour to show how you have acquitted yourselves of the mission imposed upon you.

You will not, gentlemen, expect from me even a summary analysis of all the memoirs, communications, and discussions which have occupied your meetings. You have discussed so many facts, that I should tax your patience to present to you a *resumé* of the collective labours which already fill a volume of *Mémoires* and more than three volumes of *Bulletins*. I was, therefore, obliged to confine myself to select among the subjects of your researches some few which by their novelty or importance appeared to me to have particularly excited your attention. You must have given me too many proofs of your indulgence to induce me to make such a selection, upon which I should never have ventured, if I had not found it materially impossible to submit to you a complete review of all that you have done during the past four years. Some other time, when the periodical return of our solemn meetings may restrict the report to one year, I might be able to strike the balance of your labours in a more equitable manner.

In order to put something like order in my exposition, I purpose first to examine the facts relative to ethnology properly so called, and to reserve for the end those which concern general anthropology. But it would be vain if I were to endeavour establishing an absolute separation between these two great branches of our science; for many complex questions pertain to both. It will, therefore, frequently happen, that I shall have to transgress the line of demarcation which I have just traced.

1. ETHNOLOGY.—Ethnology, or the science of human races, comprises the study of their distinctive characters and of their classification, their languages, their manners, creeds, industry and arts, and the part they play in history. There are none of these subjects upon which you have not thrown some light by your discussions and researches. You have brought to bear upon them the contingent of your special knowledge, some as naturalists or anatomists, others as philosophers, archæologists, or linguists.

The illustrious *savant* who two years since occupied this chair as president, and whose death has left such a gap in our ranks, Isidore Geoffroy Saint-Hilaire, has presented us with a memoir "*on anthropological classification, and the principal types of mankind*"—a masterly work, in which he sums up the results of thirty years' researches. Having passed in review the classifications of his predecessors, and the principles upon which they were founded, and having shown that

the most apparent distinctive characters are not always those possessing the greatest value, and according the pre-eminence to the characters of the conformation of the head, M. Geoffroy Saint-Hilaire points out that it is not sufficient to divide mankind into a certain number of races, and that the distinction rests sometimes upon first class, and sometimes upon much less significative characters, and that consequently a scheme in which all the races are disposed in the same rank, is not conformable to the principles of natural history. To obviate this inconvenience, principal and secondary races have been admitted; but there results from this a continual confusion in language, and hazardous conclusions in science, as it leads to consider all the secondary races to have descended from the same anthropological stock, which by their re union formed a principal race; and this would suppose as demonstrated what yet remained to be proved. Thus, the great Mongolian race of authors comprises the Tartars, Chinese, Malays, Polynesians, Hyperboreans, Paraboreans, all the aborigines of America, whilst the filiation of these different races, and their immediate parentage, are yet problematical.

M. Geoffroy Saint-Hilaire, therefore, thinks that the primary division of mankind, established upon distinctive characters of the first class, constitutes *types*, and not *races*, and that the determination of these types should be founded upon the conformation of the head.

The types which he admits are four in number: the *Caucasian* type is characterized by the predominance of the superior parts of the head, that is to say the region of the brain; the *Mongolian* type, by the predominance of the middle part of the head, namely, the superior region of the face; the *Ethiopian* type, by the predominance of the inferior parts of the face, the region of the jaws; and the fourth, the *Hottentot* type, by the predominance of the whole region of the face. The two elements serving to determine the relative development of the facial regions are: the breadth of that region measured by the prominence of the cheek bone, and its antero-posterior extension measured by its obliquity, or by its forward projection beyond the region of the brain. The terms *orthognathic* and *prognathic*, now become classical, clearly express the latter character. In order to express the first, namely, the transversal development of the superior part of the face, M. Geoffroy Saint-Hilaire has coined the term *eurygnathic;* and thus has been enabled to characterize in a few words the four types of mankind. The Caucasian type is orthognathous; the Mongolian type Eurygnathous; the Ethiopian type prognathous; and finally, the Hottentot type is both eurygnathous and prognathous.

All the races known may easily and naturally be divided into these four types, and those of each group are distinguished between themselves by characters sufficiently marked to enable him to dichotomize them. His synoptic scheme comprises only twelve races; but he has only admitted those best known, without pretending to give this number as definitive.

Among the races comprised in the classification of our illustrious colleague, there figure separately the *hyperborean* and the *paraborean* races, which are confounded in all previous classifications. All the peoples near the polar ocean, from Lapland to Kamtschatka, from Kamtschatka to Greenland, have been considered as forming one single race. It was supposed that living as they do beyond the arctic circle, in the same conditions of light and heat, in the midst of a flora and fauna, the relative uniformity of which is well known to naturalists,—it was supposed, I repeat, that all these peoples ought to have acquired a similar organization and the same physical type; hence they were considered as one race—a secondary race, emanated from the stock common to the Mongolian races. But this view, apparently confirmed by the observation of some superficial characters, was not founded upon the study of first-class characters; and it must be acknowledged that the admission of the anthropological identity of the polar races of Europe, Asia, and America, was somewhat lightly made. The expedition of Prince Napoleon to the northern seas has enriched the gallery of the museum with a series of crania, which has disposed of that illusion. Our colleague M. Henry Guérrault, one of the surgeons of that expedition, was struck with the considerable differences obtaining between the cranium of a Laplander and that of an Esquimaux. From the very exact and complete description which he has published in our *Mémoires*, it results that the two peoples approach the Mongolian type, the first by the globular form of the cranium, the second by the disposition termed *pyramidal;* but that these two characters, which are combined in the Mongolians properly so called, are not so in the hyperboreans (sitting of March 15, 1860). There are thus at least two hyperborean races; and this discovery, made by M. Guérrault during his voyage, has been confirmed by Geoffroy Saint-Hilaire, who, reserving for the hyperboreans of Europe the name hyperborean race, has designated the Esquimaux the *paraborean* race. Do all the peoples disseminated beyond the polar circle, on the borders of the glacial ocean, pertain to either of these two races? This is a question the solution of which requires ulterior researches.

You have received communications on the ethnology of nearly every part of the globe, either from your correspondents, or from your own members. In order to facilitate and popularize the researches, to give them as much as possible an uniform direction, and to render the observations collected by individuals unknown to each other comparable, you have paid particular attention to the drawing up of instructions destined for the guidance of travellers. The instructions for Peru, Mexico, Brazil, Senegal, and France, have already been published. Those concerning Northern Africa, Chili, Indo-China, are being prepared. These instructions are not simple interrogatories; your commissioners wished that the traveller, though a complete stranger to our studies, should find therein a summary of ethnological facts relative to the country he was about to explore; and in this didactic exposition attention is drawn to doubtful, contested, or unknown points, and especially to such of greater importance.

Our venerable colleague M. Gosse, senior, so well known by his excellent researches on artificial deformation of the cranium, and so enthusiastic for the study of the civilized nations of the New World, has kindly undertaken to draw up the instructions for Peru; to him, also, we owe the instructions for Mexico, completed by the valuable indications of Abbé Brasseur de Bourbourg, the renovator and almost the creator of the primitive history of Mexico. I would particularly draw your attention to the *Notice-questionnaire* on the ethnology of France, in which your learned reporter M. Gustave Lagneau, faithful to his motto, *Facta, non verba,* has condensed within eighty pages the history and the description of all the peoples of various races which, from the pre-Celtic period to the present epoch, have occupied, colonized, or conquered the whole or part of the French soil. A rich bibliography—original, according to the habit of our colleague—gives to his treatise a character of precision and exactness which doubles its utility. The author has justly insisted upon the origin of those circumscribed and special populations which perpetuate themselves upon several spots of our territory, without becoming fused with the surrounding populations, and who preserve their habits, manners, and particular physical characters. This part of his work will render eminent service to provincial observers.

But you will have understood that ethnological instructions are not sufficient. It is not enough to impart to travellers the notions requisite for distinguishing the races of any country before describing them; they must further be enabled to collect their observations according to the requirements of science, and for this purpose they

must be furnished with the means for study, for a certain and easy mode of investigation, and with a general and uniform method applicable to all particular cases. Such is the object of the *General Instructions* which your commissioners have been charged to prepare. Those concerning the physical, anatomical, and physiological characters of the races of man are now ready. The commissioners purpose rendering the anthropological observations accessible to every man possessing the will, and to simplify as much as possible the instruments necessary for making observations.

I am not even able to enumerate the many communications we have received on the ethnology of foreign countries, and the reports and discussions to which they have given rise. The ethnology of Africa is represented in our publications, by the memoir of M. Pruner-bey on the Negroes; by two original communications from M. Berchon on Senegal; by a note of M. A. Duval, on the Gaboon; by the reports of M. Bertillon, on Southern Africa; by M. Dally, on Abyssinia; by M. Perier, on the Kabyles, and specially on the origin of the light-haired Kabyles, who inhabit a portion of the chain of the Atlas; and finally, by two long memoirs by Pruner-bey and Perier on the ancient races of Egypt.

If our two eminent colleagues do not agree in their conclusions, you must consider the difficulty of the subject and the insufficiency of the documents we possess on the primitive period of Egypt. The Champollions, the Lepsiuses, the Mariettes, and their glorious rivals, have conducted us from century to century, from dynasty to dynasty, to the period of the great pyramid, but these brilliant conquests of archæology, by thus passing beyond the limits of the historical period, have not yet succeeded to give us the key to Egyptian Ethnology. Which was the primitive race which had the honour of kindling in humanity the first torch of civilization? Did it come from the south, from the east, or from the west? Grave questions these, allied to problems the most contested in our science, which, nevertheless, M. Pruner-bey does not despair of solving. Twenty years study in Egypt, and continued in Paris in the Anthropological Gallery of the Museum, gave him the right to speak with authority, the more so as, combining the knowledge of craniology with philology, he possessed the most reliable guides in primitive ethnology.

Our colleague was first engaged in determining the physical characters of the ancient Egyptians. Blumenbach had already remarked the little uniformity of the type of their crania, and the study of monumental paintings enabled us to recognize, that from a remote antiquity

the population of Egypt must have been subject to numerous intermixtures with various peoples of Africa, Asia, and even Europe. M. Pruner-bey in studying this difficult subject has concentrated his attention to the most ancient paintings, and the mummies of the most remote period; and he has thus arrived to establish, that from the origin of the historical period, the Egyptian population presented already two eminently distinct types which he has designated *type fin* and *type grossier* (the fine and the gross type). These two types, of which pure specimens are found to this day among the Copts, as well as among the Fellahs, are derived from two different races which were already intermixed in the Valley of the Nile, before historical times, and which saw spring up the first of all civilizations. But what was the origin of these two races? and what was their respective share in the intellectual, material, and social progress? Without giving a definitive opinion as regards the race of the gross type, M. Pruner-bey is disposed to consider it as the first occupant of the soil. Civilization, according to him, was the work of the race of the fine type, which came from a foreign country, but this race was neither Aryan nor Semitic, as might be supposed. The crania of the fine type present to those of the Asiatic races insufficient analogies. Finding thus, as regards the Orient, nothing but uncertainty, the author turns to the Occident; he compares the fine type with that of the Lybian or Berber race, and this time the resemblance appears to him complete. Philology interrogated in its turn, replies in a similar sense. M. Pruner-bey compares, first, the ancient Egyptian language with the Indo-European, then with Syro-Arabian languages, and finds between these three groups of languages radical differences, whilst the strict parentage between the ancient Copt and the Berber languages, seems to him evident. From this double series of researches, he draws the conclusion that the fine-typed race, the mother of the civilization of Egypt, was of Berber origin, but he adds this civilization did not proceed from any other, and was born in the Valley of the Nile.

Such is the system which M. Pruner-bey has developed before us with as much science as talent. To throw doubts upon opinions so consequent and supported by proofs so winning, nothing less was required than the vast erudition of M. Perier. The study of Egypt is for our eminent colleague as an heir-loom. His father-in-law, the illustrious Larrey, was one of the Pleiades of *savants* who accompanied the expedition of General Bonaparte, and which for the first time revealed to Europe the old world of the East. Devoted for a

long time to the study of Egyptian antiquities, at the same time ethnologist, historian, and philosopher, M. Perier contests one of the conclusions of M. Pruner-bey. He admits with him, that the civilization of Egypt is autochthonic; but if he is to search for its origin beyond the Valley of the Nile, he would look for it in Asia, in mysterious India, and not in Lybia.

This dissidence between our competent colleagues, which already manifested itself in the short and interesting discussion which followed the reading of M. Pruner-bey's memoir, led us to expect a more exhaustive debate after M. Perier's reply; but this hope was not realized. A sudden attack of a long and cruel malady, prevented M. Perier from attending our meetings for a whole year, and to read himself his important memoir. He has intrusted with it our colleague Edward Michaux, who was obliged to leave us. This young *sarant*, full of courage and hope, asked permission to take part as military physician in the expedition of Mexico. It was more the love of science, than the expectation of advancement which induced him to solicit this favour. Is not Mexico the Egypt of the New-World? Edward Michaux hoped assiduously to explore the sacred soil of America, this cradle of a civilization so long misunderstood, the remains of which, shrouded with briars, still astonish us by their grandeur and majesty. Attacked by that terrible scourge which has decimated our army, he died at Vera Cruz on the 8th of April, 1862, but a few days after his arrival. I cannot refrain from paying him in this place the just tribute of our regrets.

This leads me to speak of the important contributions of Mr. Gosse, senior, to American ethnology. Our venerable colleague has for a long time past fixed his attention on this subject, and his essay "on the artificial deformation of the cranium," published in 1855, whilst raising some general questions of high interest, has at the same time furnished valuable elements for the solution of some special questions. A large number of American peoples had formerly, and have even now, the habit of deforming the crania of their children, by methodical compression; and it seems that such practices, which substitute for the natural shape arbitrary and factitious forms, must deprive craniological determinations of any value and significance. This difficulty is so much greater, since certain infantile diseases may produce natural deformations which may thus be confounded with artificial deformations. An interesting collection of crania, arranged by M. Giraldès, in the Foundling Hospital, which he has enabled us to inspect, gives evidence of this cause of error; and the interesting

memoir of our eminent colleague, Dr. Barnard Davis, one of the authors of *Crania Britannica*, has shown us that pathological deformations of a peculiar type may be produced in adult, and even advanced age.

On the one hand, M. Gratiolet has drawn your attention to the circumstance that artificial deformations are, in their origin, frequently an exaggeration of the distinctive characters of the race which submit to it. Every people, whether savage or civilized, is prone to admire itself, to attach an idea of beauty or superiority to the features which distinguish them from other peoples; and it is for the purpose of giving their children a conventional beauty that mothers use mechanical appliances to compress the heads of their babies. A deformed cranium is thus like a caricature, in which the exaggeration of the most characteristic features does not destroy the resemblance, and in which an artist of experience may frequently detect the real type of the face. Thus, in comparing the non-deformed cranium of a modern Totonaque with the ancient deformed crania of the island Sacrifios, M. Gratiolet pointed out the natural character on the first skull, the artificial exaggeration of which has produced the strange form of the other crania. Hence, it is not impossible for the naturalist to detect the primitive type in a deformed cranium.

On the other hand, Mr. Gosse has, by the study of the numerous processes of deformation, that were and are still in use in America, been enabled to reduce them to five essentially distinct types, which he has described, and indicated the effects and repartition at the present time and in the past, and has shown us, by various examples, how much the study of this manifestation of human fancy may throw some light on the history of migrations. A process of cranial deformation once adopted becomes part and parcel of national manners; it is one of the most persistent habits which may survive the most distant migrations, and even the change of manners, language, religion, and social condition. Thus the various races, which composed the ancient population of Peru had each a peculiar process of deformation, and the knowledge of this fact has enabled M. Gosse, in his *Dissertation on the Races of Peru*, to rectify some of the ethnological opinions of Messrs. Rivero and Tschudi. But the most curious result of the reseaches of our colleague is relative to the history of the peoples which practise "*the relevated cuneiform deformation.*" This strange and so characteristic deformation is effected by two layers of argil—one of which compresses the forehead and the other the occiput. It was practised in Cuba, at the time of Columbus, among the Natchez and various peoples of Florida, as described in Morton's

Crania Americana, and finally in Peru, where it is still in practice among the Omaguas and the Connivos. Is it probable that peoples so distant from each other should, without knowing each other, have conceived the same idea, and the same mode of realizing it? Is it not rather more probable that a migrating people should have introduced in the different regions its national custom? But though migration from Florida to Cuba seems easy, it cannot be well understood how primitive navigators could have introduced the habit into Peru, without intermediate stations. We are then authorized to think that the people with the cuneiform crania must have traversed, in successive stages, Mexico, Central America, and the Isthmus of Panama. A bas-relief, found in the ruins of Palenqué, representing the profile of an Indian, with a cuneiform cranium, already gave support to this hypothesis; but M. Gosse gave you a more decisive proof, in an extremely deformed cranium, which came from a cavern in the valley of Ghovel, in the state of Chiapas. This cranium, covered with a thick layer of stalagmite, belongs to a very remote period, and yet it exactly resembles the cuneiform crania of Florida and Peru.

Here we have a fact, established by the study of the artificial deformation of the cranium. A great number of centuries ago a migrating people, travelling alternately by sea, or by land, traversed the immense space which separates Florida from Peru, in passing by way of Cuba and Southern Mexico.

Well, gentlemen, this craniological fact strikingly confirms traditions and the archæological documents, by the aid of which the Abbé de Bourbourg has constituted the primitive history of the new world. In his great work on Mexico and Central America, before Columbus, and in the important introduction which he has published to the *Popol Vuh*, or sacred book of the nations of Central America, the learned abbé has established, that before the Christian era the people of the Nahoas, who had come by sea, from Florida or the greater Antilles, had debarked in Mexico, not far from the spot where now Tampico stands. Descending thence towards the south, along the gulf, the Nahoas halted on the borders of the Lagune de Terminos, a small distance from the ancient empire of Xibalba, which they took possession of. The town Ghovel, which they founded at that period, is but three leagues distance from the cavern whence came the cuneiform cranium, which M. Gosse has presented to you.

After a period of prosperity, the duration of which is not yet

determined, the conquering Nahoas, driven out (174 of our era), by a national revolution, found themselves compelled to search for other dwelling-places, and one of their bands traversing the Isthmus of Panama, established itself in Peru. Thus the same people, the people of the Nahoas, has, by its successive migrations, occupied all the regions where the cuneiform deformation of the cranium was practised; and here, gentlemen, you have two valuable facts —anthropology enlightened by history, and history confirmed by anthropology.

Whilst you have paid particular attention to the civilized races of America, you have not neglected the rest. The report of M. Simonet, on the Magellanic countries; the communications of M. Martin de Moussy on the peoples of La Plata; the notes of Mr. Rameau, and of our correspondent at Quebec, Mr. Landry, on the population of Canada; and, finally, the important report of M. Dally, on the indigenous races and archæology of the United States, prove the interest you take in American ethnology. The numerous questions raised or solved in this last paper have given rise to an animated discussion, in which Messrs. Pruner-bey and Rameau have taken part, and in which the unity of the American races has been refuted by several speakers.

The peoples of Oceania have occupied a large place in your labours. You have chiefly considered them in an anthropological point of view, to which I shall presently recur; here I shall only speak of ethnological facts. The memoir of M. Berchon, on tattooing in the Marquesa Islands, has initiated you in the secrets of this practice, so prevalent in Polynesia. M. Rufz has read a very detailed report on the ethnology of Polynesia, and our two colleagues of the navy, Messrs. Bourgarel and de Rochas, have enriched your museum with crania which they brought from New-Caledonia, the New-Hebrides, and from Taiti; and have made communications full of interest, respecting the manners, physical characters, and the origin of the Neo-Caledonians. This people, which some fine day, without knowing it, found themselves French subjects, and whom our rifled guns have not yet convinced of the excellence of our rights, belong to the race of oceanic negroes, but who for a century at least have intermixed with the Polynesians. It is by the Loyalty Islands, near New Caledonia, that this intermixture has been effected. The Polynesians of Wallis Island debarked five generations ago in the Loyalty Islands, where they fixed themselves, and intermixed with the natives; and from this intermixture between a Polynesian and a Melanesian race resulted

a hybrid population, which having from the Polynesians derived a taste for maritime expeditions, sent in their turn swarms to New Caledonia. The eastern coast of this island, where the new comers again intermixed with the natives, is therefore inhabited by very diversified tribes, some nearly of a pure black, others less homogeneous, who exhibit all the intermediate tints between black and yellow. It seems, however, that the Melanesian race has conserved its purity in the western region, which is as yet but little known, and which, protected on the sea-side by coral reefs, is separated from the rest of the island by a chain of mountains.

The migrations of the Polynesians and their crossbreds in New Caledonia are of sufficiently recent a date that their remembrance is not entirely effaced; but as they rested only on vague and contradictory traditions among an uncivilized people, their history required an ethnological confirmation, which M. Bourgarel has fortunately given us. Our zealous correspondent has brought us from Eastern New Caledonia fifty-seven crania, which he has divided into three series; the two extreme series represent the types of the black aboriginal race, and of the foreign yellow race; the middle series is composed of the crania of intermediate shape, belonging to the crossbreds of the two races.

To render this investigation complete M. Bourgarel has, for comparison, added a fourth series, composed of twenty-five crania, collected in Polynesia; and taking for each series the mean of all craniometrical elements, he has shown that the yellow race of New Caledonia presents intermediary characters between those of the Polynesian and Melanesian races. Craniology, therefore, induces us to believe that this yellow race, come from the Loyalty Islands, was a hybrid race, and the correctness of the traditions collected by our missionaries is thus confirmed.

You have received but few documents relative to the ethnology of Asiatic nations; you have, however, heard a report by M. Pihan Dufeillay on the inhabitants of the Andaman Islands; a notice by M. Fuzier, on the crania which he brought from China; a lecture by M. Armand, on transgangetic India; and a communication from M. Pruner-bey, on the Druses. Finally, M. Cordier, in presenting us with a Turkish cranium of the seventeenth century, established an anatomical and artistic parallel between the Turkish, Greek, and Arab head. This eminent artist had already presented you with the three remarkable busts which adorn our room; and he has taken this opportunity of expressing his ideas on the reproduction of ethnic

types by statuary. Our colleague, you are aware, has opened to art a new field, by demonstrating that beauty is not peculiar to such or such a type; that each race has its beauty, which differs from that of other races, the ideal type of which must reflect in a harmonious equilibrium the intellectual and moral characters, not less than the distinctive features of that race. The laws of beauty are thus not universal, no more than the canon of the proportions of the human body; they should be studied, and specially determined for each race; and it is by this means that M. Cordier, causing the rays of science to penetrate art, has on his return from his travels been able to create that beautiful ethnological gallery which excites the admiration both of artists and savants.

It is with regret that I must pass over several other communications, viz.—on art considered in its relations to ethnology; the remarks of M. Gratiolet on the cephalic types of Grecian statues; those of M. Boudin on the conformation of the base of the thorax in the ancient Greeks; the report of M. Cordier on the system of proportion; of M. Lihartzik, and the notice of M. Duchenne (of Boulogne) on the Egyptian canon rediscovered by M. Charles Blanc.

I hasten to come to that part of your labours which concerns the ethnology of Europe, and especially that of France.

It is the duty of our society to give a vigorous impulse to such researches as may throw the light of science on our national origin. You have not neglected that duty; you began your labours with it, and you have embraced every opportunity to discuss this question. Convinced that craniology is one of the surest guides in investigations of this kind, you have in your museum arranged a large collection of crania of every epoch. Nearly five hundred ancient and modern crania, of authenticated origin and of approximatively ascertained dates, taken partly from the ancient cemeteries of Paris and partly from the Merovingian or Gallo-Roman sepultures, enable each of you to study the primitive type, and to follow from age to age the effects of the admixture of races. This already rich collection grows from day to day, and I need not remind you that his Majesty the Emperor, in sending you a cranium found beneath a Roman wall, in the excavation of the camp Saint-Pierre, near Compiegne, has directed M. Viollet-le-duc, the director of the excavations, to send you, in his name, all the crania and skeletons which may yet be found there. M. de Roucy, the learned archæologist of Compiegne, who has been charged by the Emperor to conduct the excavations of Mont Berny, has discovered near the ruins of a Gallo-Roman town,

in the country of the ancient Suessones, a burial ground, from which fifty-four skeletons have been exhumed. Seventeen crania have already been received, the rest will follow. I must here not omit commending the intelligent zeal of our colleague, M. Bourgeois, of Pierrefonds, who living in the vicinity of these excavations, has drawn out a plan of the cemetery, indicated the direction and depth of each tomb, measured one by one all the bones of the skeletons, and has delineated the strange attitudes of these bodies, which seem to have been interred precipitately, after some battle between the Gallo-Romans and the barbarians of the fifth century.

In these diverse series of crania, as well in that which our colleague M. Brullé, of Dijon, has extracted from the sepultures of the time of the Burgundians, and which he has presented to us, you have constantly, among the intermediate forms, found two essentially distinct types, the one brachycephalous (head round or short), and the other dolichocephalous (head long), both represented by specimens the more numerous the more we distance the actual period. This is a certain indication of the intermixture which has taken place on our soil before and during the historical period between the groups of races, the one brachycephalous, the others dolichocephalous. Now, all the foreign peoples of the Indo-European stock who have one after another invaded, conquered, or occupied the whole or a part of our country, the Celts, the Kymris, the Germans, were dolichocephali, and so were the Romans, though in a less degree. It is, therefore, not doubtful that the brachycephalous type, still so prevalent among us, is derived from populations anterior to the arrival of the Celts, and, moreover, a considerable number of facts which have been on various occasions expounded by Messrs. Darest, Pruner-bey, Lagneau, Rameau, and other members, have directly demonstrated that, in the period of the stone-age, Denmark, the British Isles, France, Switzerland, and no doubt other countries of Europe, were inhabited by brachycephalous races.

These primitive peoples, the names of which seem irrecoverably lost, were long before the historical period overrun by successive waves of dolichocephalous races from Asia, and then commenced between these two groups of populations an immense struggle, which spread from the Vistula to the Atlantic, from the Baltic to the Mediterranean, and which, no doubt, continued for many centuries; an unequal struggle, in which the stone hatchet proved useless against the bronze weapon, and in which the superiority of arms conquered the superiority in numbers. In vain did the autochthons take refuge in their lacustral

habitations, where their conquerors, by the law of retaliation took, at a later period, refuge in their turn.

The tranquil waters of these lakes, which protected the habitations from beasts, could not protect them against the attacks of man, and the fire kindled by the torch of the enemy easily destroyed their wooden houses, the carbonized remains of which, found in the basin of the lakes, intermixed with piles, arrows, flint-hatchets, and knives, bring before our minds the terrible drama of these conquests. M. Gosse, junior, has, in a highly interesting memoir, told you that nearly all lacustrian habitations have been destroyed by fire, both those of the stone period and of the bronze period.

Everywhere vanquished, sometimes destroyed, more frequently subjugated, the aboriginals still preserved in the regions of the south and east their numerical preponderance, and, intermixing with their conquerors, they engendered hybrid races, which in proportion of the intermixture received in an unequal degree the respective impress of their parent stocks. But whilst they preserved, at the cost of greater or lesser alterations, some of the physical characters, they lost their nationalities, their manners, their language, and even their names. Nevertheless, in some localities better defended by Nature, in certain valleys difficult of access, which perhaps the conquerors did not covet, the *débris* of primitive populations escaped the common lot. Such, no doubt, were the ancestors of those Roman Rhaetians, which our eminent colleague M. de Baer has studied in the environs of Coire. M. Dareste, in his report on the memoir of the learned Professor of Saint Petersburgh, has told you how M. de Baer was led to conclude that the inhabitants of the ancient Rhaetian Alps were of the brachycephalous race. Not sufficiently numerous to constitute a nation, they have only preserved their type, and their language in a Latin idiom. But in the chain of the Pyrenees and their slopes, an intelligent and heroic people preserved both their nationality and customs as well as their language. M. Pruner-bey said:—The Basque is the most ancient of all known languages; alone has it survived the wreck of the primitive idioms of Europe; alone does it stand as a living proof of the existence of aboriginal races before the Asiatic invasion, and if, gentlemen, you compare with this irrefutable linguistic proof the anatomical facts which, directly or indirectly demonstrate, that at least some of these were brachycephalous races, you will understand how the illustrious Retzius and all ethnologists after him have been led to conclude that the Basques must be also brachycephalous. Two crania examined by the great Swedish anatomist confirmed this doctrine, and the observations made by M. A. d'Abbadie on the living

gave a fresh support to this theory. Still, a fact of such importance, the keystone as it were of the primitive ethnology of Europe, required a more complete and direct demonstration. For the last four years, foreign ethnologists have frequently applied to you, vainly expecting to find in your museum some specimens of the crania of the Basque race; but excepting the two crania in Stockholm, this race had no representative either in our or any other collection. This gap no longer exists. Two of our members have, with their own hands, exhumed from a cemetery in the province of Guipuscoa sixty Basque crania which have been for some months deposited in your museum. You were thus enabled to control by anatomical examination the rational opinion of Retzius. But why has the verification not been conform to our expectation? Of the sixty Basque skulls in your collection, two or three only are really brachycephalous; most of them are altogether dolichocephalous; and, what was quite unexpected, the mean type of the series is much more dolichocephalous than that of the French in the north.

Are we, then, obliged to reject the whole doctrine of the primitive ethnology of Europe? Is this doctrine sapped at its base? Not so, gentlemen, it is not even shaken. The facts upon which it reposes are sufficiently numerous and decisive, to be considered as settled. Yes, the pre-Celtic populations of Denmark, the British Isles, France, and Switzerland, were mostly brachycephalous. Nothing can destroy this clearly demonstrated fact. But does it follow that before the arrival of the Celts there were none but brachycephali in Europe? Remote as we are from this mysterious period, we are like benighted travellers who, at a distance, confound all the trees of the forest in a single mass. It is rather much for our mind, which only gropes its way, to assume that an unique aboriginal race has upon our soil preceded the races which have made themselves a name in history. But when at present we find the earth covered with a number of peoples, as diversified by type as by language, when we see the most distinct races living side by side, with or without intermixture, upon what grounds do we pretend to assert that the population of Europe must have been uniform four or five thousand years ago? Was humanity then so very young? And migrations and the struggle between races, had they not had sufficient time to spread in different parts of the globe different types? But why make suppositions after the facts have spoken? The diversity of the primitive peoples of Europe is established by human palæontology. To the series of observations which prove the pre-historic existence of brachycephali, we must join a

series of observations, less numerous it is true, but not less decisive, which demonstrate the co-existence, perhaps the anteriority of the dolichocephalous type. The cranium which M. Garrigou has extracted from a cavern in the Pyrenees and which you have seen in its bed of stalagmite is dolichocephalous; the cranium of Meilen, which comes from a lacustral habitation of the stone period, and of which M. Vogt, of Geneva, has sent you a sketch, is equally dolichocephalous. The celebrated skull of the cavern of Engis which M. Schmerling has found among the remains of the elephant, rhinoceros, and other extinct animals, presents the same form. And the still more celebrated skull of the Neander-valley, of which Professor Schaaffhaussen of Bonn has recently sent you a description, and of which you will soon receive a cast to be presented by M. Pruner-bey—this cranium with a form so strange that many *savants* have considered it the oldest cranium known, is it not remarkable by its narrowness and length? In the presence of these facts, gentlemen, it is impossible to disown, that one or several dolichocephalous races must have existed in Europe at an immensely remote period; and even if all the actual Basques were as dolichocephalous as those in your collection, which is as yet problematical, the ethnological theory advanced by Retzius and defended by Pruner-bey with so much authority, is not overthrown by one more exception.

On approaching our own the historical period, you have by your labours and discussions thrown light upon many questions relative to the ethnological origin of our own nation. The memoir of M. Lagneau *On the Gaels and Celts*, in which sound criticism is joined with profound erudition, has proved to you that these two peoples, confounded into one by William Edwards, were, if not different in race, at least in nationality. Our indefatigable colleague M. Halléguen, of Châteaulin, has, in his two memoirs *On the Ethnology of Brittany*, protested against the too exclusive theories and complaisant legends which attribute to the immigrations of the insular Britons an exaggerated ethnological and political influence.

The determination of the physical character of the Gaelic race has been the object of your special attention. Like William Edwards, the great teacher of French ethnology, you have in the actual populations searched for the distinctive features which still stamp their origin. The influence of the ethnological stock upon the variations of stature has been rendered evident by statistics based upon the conscription for the army. The valuable documents of M. Boudin in his *Medical Geography*, have placed at your disposal this new element of

anthropological study. Maps differently shaded represent the repartition of exemptions, or short stature, in the different departments, and have thus, so to say, placed before your eyes the ethnological Gaul of *Cæsar's Commentaries*. M. Sistach, confining himself to a more recent period, has prepared a new map so similar to the preceding, that you were struck with the resemblance. More recently still, M. Boudin placing the examination of this question upon a different basis, has contrived a fresh map, showing the repartition of high stature and the differences which he has remarked between these fresh results and those relating to short stature. This has given rise to a learned dissertation by M. Bertillon, on the law of great numbers and on the significance and interpretation of statistical documents.

Recruiting has not merely revealed the ethnological influences upon stature. Several maps prepared by M. Boudin have shewn us that the distribution of myopia, rupture, bad teeth, depend greatly upon race. In this respect, as well as in regard to stature, there exists the most striking contrast between the populations of Brittany and Normandy; and M. Bertillion has shewn us, by valuable statistics, that these two populations, so different in origin, occupy the two extremes in the scale of mortality in France.

We possess as yet no numerical report on the dominant colour of the eyes and hair in the various departments of France. All that we know in this respect rests only upon individual impressions. The precise account of our colleague Dr. John Beddoe of Clifton, on the population of Ireland, partly fills the gap; for the ethnological elements which he has examined much resemble those of several of our departments.

Before leaving the field of ethnology, I cannot omit to cast a rapid glance on your linguistic labours. You have by them thrown light upon some special questions; and I must, above all, render justice to the profound knowledge of our colleague M. Pruner-bey. Is there one point of philology which he is not ready to tackle? Is there a family of languages of which he has not fathomed the structure and studied the development and filiation? You have just heard him on the Egyptian origin, passing in review all the languages of Africa and Western Asia; the languages of America, and even those of Australia, had their turn. He it was who made us acquainted with the repartition of the principal primitive systems of numeration; and you would have felt surprised if he had let pass without comment the eloquent and learned communication of M. Chavée *On the Parallelism of the Indo-European and Semitic Languages*. With that lucidity

and conviction which give so much value to his opinion, M. Chavée directed your attention to the essential, radical, and absolute difference which separates these two families of languages; and, despairing to approach them by any filiation, he boldly infers the original diversity which has given rise to them. In his exposition there were two different things: a fact and a conclusion. The fact has been questioned by M. Halléguen, who has pointed out some points of resemblance between the Semitic grammar and that of the Indo-European languages; but it has been accepted without reticence by M. Pruner-bey and M. Rénan, the eminent historian of the Semitic languages. Both have declared that it was as impossible to derive the Sanskrit from the Hebrew as the Hebrew from the Sanskrit. Still they do not admit that the conclusion of M. Chavée is demonstrated. M. Rénan considers the conclusion as possible, even probable; but he adds that all that has passed before the origin of civilization, before the constitution of society, before the organization of languages, is unknown and inaccessible to linguists; and M. Pruner-bey, in assuming the possibility of another hypothesis, remarked that though the Aryan, Semitic, and Turanian languages exhibit no direct relationship, they might possibly have come from the same stock—from a linguistic family lost to us for ever. You have followed with interest the phases of the great discussion on M. Chavée's new mémoire, *On the Morphology of Chinese Syllables*. Here, also, upon a more difficult field, have the same doctrines been discussed with the same talent.

II. General Anthropology. Time presses, gentlemen; it passes too slow for you, who favour me with your attention, too rapidly for me, who would wish to follow you in all your researches and discussions: but want of space compels me to make an almost arbitrary selection among the numerous materials with which you have enriched the science.

If your ethnological labours have been fruitful, it is because you have known how to apply particular facts to general questions; because, beyond the consideration of types and races, you always evinced the desire to trace the laws of the human organism, the causes of the complex phenomena which manifest themselves under the influence of heredity, education, external media, the conditions which preside over the development of man's social existence, his industry, and his intellectual progress. These subjects of research, as important for the naturalist as the philosopher, the physician, and the physiologist, belong to general anthropology; and I should wish to resume properly what this science owes to you.

Here, in point of fact, all questions were new; the facts themselves were to be collected; they had never been publicly discussed; they were to be analysed, interpreted, grouped; a building was to be constructed, and what a building!—the Palace of Mankind.

I shall not tell you that you have completed a work which will require the coöperation of generations. But you have at least laid down a solid foundation; upon several spots the walls rise already; and I venture to tell you that in four years you have effected more than you expected yourselves.

The position of man in nature is not yet clearly determined. In a purely zoological point of view, or, if you like, from an anatomical standpoint, he differs less from four superior apes than they differ from other apes. He forms with them a natural group—the anthropomorphous group—of which he is only the first subdivision; and our learned colleague, Professor Charles Martens of Montpellier, has made us acquainted with two osteological characters exclusively belonging to this group. But, though by the structure and disposition of his organs man differs but little from the superior apes, he differs from them eminently by his mind and by his language; and, according to the different standpoints which one takes, it may be asked whether man forms in nature a kingdom, a class, an order, or only a genus of the order of primates? You have not discussed this subject in its *ensemble*, but M. Gratiolet has spoken before you of the more important part of this subject. Man is *man* by his intelligence; he is intelligent by his brain; and it is by his brain that he ought to differ from the apes. Yet it is with difficulty that anatomy finds some slight differences between the encephalon of the chimpanzee and the lord of the earth, as pointed out by M. Auburtin. The pretended characters invoked by Mr. Richard Owen have been found incorrect. The superior apes have, like ourselves, a posterior lobe, a posterior cornu, and a hippocampus minor; and there is nothing, unless it be the great difference in mass and the unequal richness of secondary convolutions, which establishes in adults a radical and absolute distinction between the brain of man and that of the superior apes. But embryology and pathological anatomy have furnished M. Gratiolet with a decisive mark of distinction. The order in which the convolutions develope themselves is absolutely different in the two groups. Those which in man appear first, are in the ape formed last, and *vice versâ*. What is the result? When from any cause whatever there is in a child an arrest of development of the brain, that organ, so far from approaching the conformation of the brain of apes, differs from it more and more.

This arrest of development, which constitutes microcephaly, always produces a more or less complete idiotcy. The brain of microcephali is poor in convolutions, and these not being closely pressed against each other, leave isolated their impress upon the internal surface of the bones of the cranium. The discovery of this fact has induced M. Gratiolet to search if in the inferior races, whose convolutions are less developed, the cranial parietes did not present analogous impressions; and he has shewn you the existence of this character in a Totonaque skull, which since then you have also found to exist in some negro skulls.

This communication, in which our colleague in his happy style has treated of the highest questions of cerebral physiology, has enabled you to discuss the relations of the volume and the shape of the brain to the intelligence of individuals and races. Does the brain perform its functions as a simple organ, or is it composed of several organs subservient to isolated manifestations of various faculties? Is there any relation between the development of this organ and its functional activity? Is there a limit as to weight, below which there is no intelligence manifested? Finally, is the capacity or inferiority of individuals and races wholly or partly dependent on the conformation and volume of the encephalon? Such is the vast field you have passed through. You have heard successively Messrs. Auburtin, Perier, de Jouvencel, Giraldés, de Castelnau, Baillarger, Delasiauve, and above all Gratiolet; and this debate, continued through several sittings, has given rise to a memoir by M. Dareste, in which he has brought to light a number of new and important facts.

The memoir of M. Boudin, on *the non-cosmopolitism of the races of mankind*, has enabled you to examine the question of acclimatization, so important for the colonizing and commercial nations of Europe. Is man cosmopolite? Can he live and preserve his race in every climate? The author of the *Medical Geography* was well fit to try the solution of this problem. He has shown you by history and statistics that excepting a few races, and particularly the yellow race, acclimatization is circumscribed for each race, and subordinate to certain conditions of climate and other media. If many colonies seem to prosper, in spite of these conditions, it is because they are continually reinforced by the mother country. But the rate of mortality exceeding the births proves that the transplanted race does not maintain itself, and that it would become extinct sooner or later, if it were isolated. Our learned colleague insists specially on the obstacles opposing the acclimatization of Europeans in the tropics, in the diseases they con-

tract, from which the natives are more or less exempt; but he adds that the southern hemisphere is much less inhospitable than the northern, and he particularly points out several stations in Oceania remarkable for their salubrity.

These ideas, which so little conform to those generally received, were not allowed to pass without discussion. MM. Brown-Séquard, Baillarger, Verneuil, Bertillon, Martin de Moussey, Simonot, have successively spoken on the subject. M. Berchon has cited facts to the contrary; but notwithstanding some correction of secondary details, it seemed to result from numerous documents submitted to you, that the European races cannot, without continued reinforcements from the mother country, maintain themselves in tropical Africa and Asia.

The study of the diseases which carry off such a number of individuals transplanted to foreign climates, and which do not attack the natives, has enabled M. Boudin to point out the aptitudes and pathological immunities of a certain number of races. As every race has its organic and physiological type, so it has its pathological type revealed by its dominant diseases—by its resistance to certain morbid causes, whilst on the other hand it is prone to contract diseases which do not affect the other races. Thus the "tonga", this curious ulcer which spares scarcely any native of New Caledonia, and which, like the small pox, rarely attacks the same individual twice, is seemingly not developed among the whites who inhabit that island. Negroes, so much subject to phthisis, even in their own country, are much less exposed than the whites to hepatitis, dysentery, and intermittent fevers. Diseases of the heart and arteries, so common among the English in India, as well as among the English at home, are exceedingly rare among the Hindoos; and cancer, which commits such ravages amongst us, is nearly unknown in New Zealand, South Africa, and among the Indians in Canada. The communications of M. Berchon on Sénégal; of M. Rochas, on New Caledonia; of M. Martin de Moussy on South America; of Mr. Hayward on New England; of Mr. Sandry on Canada; the numerous facts contained in the report of M. Bertillon on South Africa; of M. Rufz on Tahiti; of M. Dally on Abyssinia; the documents collected by M. Boudin on the aissano, or snake charmers; the notice of M. Rameau on the dominant diseases in the United States; and a number of other notices scattered in our bulletins, constitute already a mass of materials, by means of which we may soon constitute a *comparative pathology of the races of mankind.*

Two questions, apparently opposed, and yet connected, that con-

cerning the intermixture of races, and that relating to consanguinity of marriages, have been mooted before you by Messrs. Boudin and Perier. The union of two relations and that of two individuals belonging to different races are like the two extremes of the same series. Is consanguinity a cause of disease and degeneration? Is intermixture a means of improving the races? M. Perier answers these questions in the negative. Consanguinity is only injurious by hereditary disease; but when the two related parents belong to a family exempt from hereditary vice the fact of their relationship cannot injuriously affect their progeny. M. Bourgeois, M. Dally, M. Sanson sustained the same opinion; and the latter has related to you a number of facts borrowed from zootechnics, challenged by M. Boudin. Referring to statistics, the basis of which had been discussed by M. Dally, M. Boudin produced the figures which at any rate seemed to establish the influence of consanguine marriages in the production of deaf-mutism, and our colleague of Nogent-le-Rotrou, M. Brochard, has transmitted to you reports testifying to the same fact.

The second question in regard to ethnic crossings has been investigated by M. Perier, in a long treatise which has appeared in our *Mémoires*. Without asserting, as some modern authors have done, that all crossings of races are followed by a physical and intellectual degeneracy, and whilst admitting that races of the same type, of the same stock, may intermix without injury, our colleague thinks that crossings between remote races can only have injurious results, and is of opinion, *cæteris paribus*, that pure races are superior to the mixed races. M. Boudin joins M. Perier to proclaim the physical, intellectual, and moral inferiority of certain mongrels. M. de Quatrefages, however, without doubting these facts, maintains that in many cases intermixture tempers the races, improves their instincts, developes their aptitudes, and sometimes engenders capacities not possessed by the primary races.

Thus arose a discussion, which after occupying several of our sittings, gradually approached the most arduous questions of anthropology. The questions of the permanence of types, of the heredity of natural characters, of accidental characters, of atavism, which causes, after several generations, the types altered by crossing to re-appear; all these have in their turn been explored and solved according to the various standpoints of the speakers.

All agree that certain types have maintained themselves unchanged since the Pharaonic epoch; that some of them have even survived

multiplied crossings, and a total subversion of political and social conditions; but the dissidences only manifested themselves when the question arose whether the permanence of types was a general law, and whether certain races might not, under the influence of a change of external conditions, undergo more or less trenchant modifications. The question was asked whether the European race implanted for some centuries on the continent of America have in the new climate preserved their primitive character. The observations of M. Rameau on the Anglo-Americans have revealed some curious particulars; but his remarks in regard to domestic animals and plants, and also to man, are merely relative to vital activity and functional power, but not to typical characters. The particulars furnished by M. Quatrefages would acquire more weight if they are confirmed; for they tend to establish that in some spots of North America the European and African races have something in their physiognomy which approaches them to the red-skins. But M. Martin de Moussy has opposed to these yet doubtful instances that of the Europeans of Paraguay, whom he has carefully observed, and who since the sixteenth century have maintained their type, without any alteration. He refers particularly to the history of a German colony, founded in 1535, by the soldiers of Charles the Fifth, who since that time have received no addition of a German element. These Germans of Paraguay are to this day perfectly like the Germans of Europe.

It is not only to the influence of climate that the power of modifying the human types is attributed. It was asked whether certain artificial forms of the head might not during a series of generations become hereditary and produce permanent characters surviving the practice of deformation. This interpretation, admitted by M. Gosse, senior, as regards certain races of Peru, is doubted by M. Gratiolet, who has quite differently explained the facts invoked, and also by M. Perier, who has read before you his memoir on the *Heredity of Anomalies*.

A report by M. Trélat, on the extinction of the native races of Oceania and Guyana, induced you to trace the causes of such a deplorable result, which manifests itself wherever Europeans come in contact with uncivilized peoples, even when no violence is done to them. The diseases imported by the whites, the vices which they introduced by example, are only partial causes; it is not by increase of mortality, but by the diminution of births, by the diminishing fecundity of the females, that half savage populations perish when suddenly brought into contact with a civilized race. There was but one step

from this grave question to that of the perfectibility of the inferior races. Messrs. Quatrefages, Rufz, Delasiauve, and Pruner-bey, think that every race is perfectible, even that the Australians are not refractory to civilization; whilst Messrs. Perier, O'Rorke, and George Pouchet, despair of the future of these peoples.

I should here leave a serious gap if I were to omit mentioning the application of the facts furnished by zootechnics, namely, the examples of the races of domestic animals to the study of general anthropology. Messrs. de Quatrefages, Geoffroy Saint-Hilaire, Perier, Auburton, Trelat, Lagneau, and especially M. Sanson, have in the discussions relative to the intermixture of races, consanguinity, heredity, perfectibility, the permanence of types, brought to bear the facts borrowed from zootechnics, and M. Davelouis has, in a special mémoire, expounded the ideas of his teacher M. Geoffroy Saint-Hilaire, on the relations of the latter science to anthropology.

In all these discussions on general anthropology you have listened to two series of arguments, inherent to two doctrines, which everywhere cause dissension, but are here, thanks to your exclusively scientific spirit, calmly discussed. For you, the monogenistic and polygenistic doctrines are no weapons of war; you do not bring to bear upon them political or religious prejudices; they do not divide you into two hostile sects, and the moderation, urbanity, and good faith which reign in your debates, prove that your opinions on this or any other point are only based on science. Without seeking for the occasion to express your opinions you have never dissimulated them. Last year, a report of M. Simonot induced you to investigate the causes of the colour of the skin of the Negro. This was the prelude of a discussion, which took place after a lecture of M. Pruner-bey, and which embraced all the questions relative to the influence of external conditions on the physical characters of the races of mankind. Messrs. Quatrefages and Pruner-bey on one side, and Messrs. d'Omalius d'Halloy, Trelat, Bertillon, Dally, and Sanson on the other, have treated these questions from opposite stand-points. No conclusion was arrived at, nor was it intended. Whilst each of us expresses his opinion freely, the society will never be called upon to express one; it is neither monogenist nor polygenist; it is a scientific association where everyone who likes to search for the truth may take his place without being asked to render an account of his opinions.

Moreover, gentlemen, this debate on the origin of races which some twenty years ago was called "The Great Controversy," is now produced under conditions, which renders it tributary to a greater ques-

tion which may not admit of a decisive solution for a long time to come. When it was believed that humanity was quite recent and scarcely six thousand years old; when in the valley of the Nile upon monuments forty centuries old, there were found represented ethnic types as distinct then as they are now, Jews, Greeks, Egyptians, Hindoos, and Negroes, entirely like their present representatives, it might have been expected that the day would arrive when the question of the multiplicity of primitive types would be solved. But at this moment, the date of the first appearance of man seems indefinitely remote; the periods are no longer counted by hundreds or thousands, but by myriads of years, and we know that our five thousand years of history are but a short episode in the life of humanity. The types which we are enabled to study, appear to us permanent. Can we say that they are so? The four thousand years which have elapsed since the ethnic types have been depicted on the Egyptian monuments, may have produced in the corresponding races changes too slight to strike our attention, equivalent, for instance, to the tenth part of such which constitute for us race characters. But multiply this lapse of time by ten, and there will appear before us, I do not say demonstrated or demonstrable, but simply as possible, a conciliation of the monogenistic theory with most of the facts upon which the opposite theory rests.

This question of the antiquity of man which heads all the rest, could not escape your attention. It was not here that the question was engendered, but you were the first who examined, fathomed, and completed it; and I venture to say, that your discussions, reproduced in a great number of scientific and even political journals, have powerfully contributed to the triumph of truth. It is not lightly, gentlemen, that you have accepted the discoveries and the demonstration of Boucher de Perthes. When M. Geoffroy Saint-Hilaire, in the sitting which preceded the first communication of M. George Pouchet, placed before you some hatchets and knives from the diluvium of Abbeville, objections were raised as to the validity of these proofs. Some of you doubted the origin of the flints, the abrupt surfaces and contours of which might have been produced by accidental causes. But when M. Boucher de Perthes sent other hatchets, when M. Gosse found exactly similar ones in the diluvium of Paris, together with knives and arrow-heads, the constant repetition of the same forms brought conviction to your minds.

The discussion which followed on primitive industry and its successive periods, on the transition from the roughly-worked to the polished flints, on the transition periods from the stone to the copper or bronze

age, and from this to the iron period; this discussion, in which Messrs. Geoffroy Saint-Hilaire, de Castlenau, Gosse junior, Lagneau, Baillarger, and Verneuil, took part, and which implements M. Trelat compared with the actual industry of savage peoples; this discussion, I venture to say, may be cited as one of the most important and interesting contained in your *Bulletins*.

M. Gosse has exhibited before you, in the same gravel-pit, still moist, a fossil rib of the aurochs, and a flint arrow head; he has further shown you a carbonized bone which he has extracted from the diluvium in the gravel-pits of Grenelle. M. Geoffroy Saint-Hiliare has communicated to you the curious discovery of M. Lartet, who found upon the fossil bones of the *rhinoceros tichorinus* and the *cervus megaceros*, deposited in the gallery of the museum, the impress of the stone-hatchets with which man used to cut up the animals before consuming them. I must condense, gentlemen, for the facts are here already too numerous to bear citing, but I must, nevertheless, remind you of M. Delanoue's interesting communication on the researches made in the valley of the Somme, and of the geological proofs regarding the antiquity of the diluvium, which, in addition to the hatchets, contains the remains of the rhinoceros and the elephant.

An intelligent being, capable of working the flints, of kindling fire, of killing and cutting up large animals, has then existed upon our soil simultaneously with the mammoth, the rhinoceros, the gigantic deer, and the cavern-bear,—animals the species of which have been extinct for an incalculable period of centuries.

The antiquity of man is thus reduced to the commencement of the quaternary period. It might ascend to the tertiary period, if it were true, as M. de Jouvencel supposed, that the sand pipes (*puits naturels*) were the work of man. But M. Bert has opposed this hypothesis by objections on the value of which I can pronounce no opinion. Moreover, the moment has not yet arrived to fix the time of man's advent upon the earth. Positive facts, irrefutable evidence, show that man existed at the time of the diluvium; this is the first date of his history, or rather the first known date, but it is not impossible that we may find traces of his earlier existence.

In order to form some idea of the immense period of time which must have elapsed since the diluvial hatchets were worked, I must recall to your minds the details given by M. Delanoue on the geological constitution of the bed of the Somme. There are, in the environs of Amiens, beneath the recent and the loess formation, the thickness of which amounts frequently to ten meters, two strata

of diluvium, the one red and superficial, characterized by its irregular and but little rolled flints; the second, deep, of grey colour, the round flints of which have been strongly rolled. These two strata, each several meters in thickness, are separated by a layer of lacustral deposits, containing fresh-water shells, and which has sometimes a thickness of five meters. Now it is exactly in the grey or *inferior* diluvium, immediately beneath the tertiary formations, that the remains of human industry have been found associated with the fossil bones of the mammoth and rhinoceros. Thus, after the first diluvial epoch, which gives us the first date of humanity, there was a longer period of repose during which fresh-water lakes were formed above the inferior diluvium; a second geological change then induced the formation of the superior diluvium; at a later period, the conditions changed again, and a thick layer of loess re-covered the flints of the second diluvial period; and finally, a new order of things took place, during which, the recent terrains were formed above the loess. It follows thus, that since the hand of man fashioned the flints of the valley of the Somme, the geological conditions have changed not less than four times, and the duration of these successive periods is truly incalculable. It is remarkable that, whilst the remains of human industry are so over abundant in the inferior diluvium, there is no trace of them in the layers which separate this diluvium from the vegetable soil; man excluded from these parts by the accumulation of lacustral waters, could only reappear there at a relatively very recent period, after the extinction of the large animals, which he formerly combated, after the fusion of the glaciers to which M. Delanoue is inclined to ascribe the loess formation. During this long glacial period, of which Mr. Ch. Martens has given you so clear and learned a description, a large portion of Europe became gradually covered with ice, and many species unable to defend themselves against the cold perished, whilst man, by his industry and intelligence, contrived to escape this wholesale destruction. By striking flint against flint, to fashion his primitive weapons, man perceived the rising sparks, he learned to retain them, and the fire first kindled for his rude feasts, became afterwards his protection against the inclemency of a glacial climate.

We possess at present but one testimony as regards the existence of man at the period of the extension of the glaciers, which gives at the same time evidence that he then possessed the use of fire.

The soil in Sweden is at present in several regions the seat of a gradual upheaving, whilst in other regions it gradually sinks, and these imperceptible oscillations had already commenced before the

glacial period. Large tracts, formerly inhabited, disappeared beneath the waters of the Baltic, the sea had covered them with sand and shell banks; large floating islands detached from the glaciers of the Scandinavian Alps ran aground upon these shoals. When now the time arrived for the fusion of the glaciers, the erratic blocks which they had transported sank to the bottom, and the waters again covered its banks with shells. Then the soil so long submerged again began to rise. The erratic blocks first rose above the level of the sea, after them appeared the shell-banks, then the sand-banks, and finally, the primitive soil emerged in turn after a period of submersion of which it is impossible to estimate the duration.

How much time was not required before this region emerged from the sea could have become habitable, before the thick shroud of sand which rendered the surface sterile, was covered with humus, in order that man should find his means of subsistence, have prospered and multiplied beyond measure, so that Scanzia was called by the ancients the great workshop of peoples, *Scanzia officina gentium* (Jornandès)! And nevertheless, this period is very short compared with that which has elapsed from the commencement of the glacial period to the fusion of the ice. M. C. Martens has told you how the glaciers are formed and how they disappear. It is not an excessive cold which produces them; the conditions in which they formerly were formed in regions now temperate did not much differ from those which surround us. If they finished by invading the greater part of Europe, it was only at the end of a multitude of centuries, and they retired as slowly.

Well, then, man has witnessed successively these two changes of our hemisphere; he receded step by step before the advancing glaciers, until their retirement rendered to him gradually his ancient domain, though rent and torn up. In digging a canal in the vicinity of Stockholm one of the eminences, which are named *osars*, and which at the glacial period were by the floating ice deposited upon the submerged plains of Sweden, was cut through. There, beneath an enormous mass of erratic blocks, and below the sand and shell banks, at a depth of eighteen meters, was found a circular range of stones, forming a fireplace, in the midst of which there was charcoal. What hand was it that collected those stones, and kindled that fire, unless it was the hand of man? Man then existed before that long series of phenomena described by M. Charles Martens; and yet that date, so immensely remote, is but the second date of humanity. The first is that of the diluvium, and everything

induces the belief that it is more remote from the second, than the second is from the present period. To these irrefutable proofs of the antiquity of man, others may be joined which have for a long time been discarded by prejudiced minds, but the value of which you have always recognized. Frequently, both in Europe and in America, human bones, implements made of flint, bones, or stag horn, cinders and charcoal, have been found in caverns, mixed with the remains of animals of the quaternary period. M. Geoffroy St. Hilaire has justly observed that if the bones of any other animal than those of man had been found under similar circumstances no one would have dreamt to deny their antiquity. But he adds, as the co-existence of man with the extinct animals could not be admitted without undermining a doctrine so deeply rooted in science, as well as in theology, the mind was tortured to find reasons for non-acceptance; and the most various and sometimes extremely improbable hypotheses were imagined, to explain how these human bones were subsequently transported into these caverns. This was the opinion three years ago of the illustrious colleague whom we have lost. A few days after he showed us a staghorn arrow, found by M. Alfred Fontan in a cavern, where also two human teeth and the remains of several extinct animals were found. This arrow, notched at the edges, presented upon one of the surfaces little grooves, probably as M. Lartet supposes for the reception of poison. This fact, accepted by so cautious an observer as M. Geoffroy St. Hilaire, by so expert a geologist as M. Lartet, has greatly struck you; and when afterwards you heard of the human skulls found by M. Schmerling and M. Spring, in the caverns about Liège, of those found by Mr. Aymard in the osseous breccia of Mont Denise, of those found by M. Lund in the caverns of America, you evinced no incredulity; but you would perhaps have evinced greater hesitation if the discovery of M. Boucher de Perthes had not previously prepared you for accepting these multiplied evidences in favour of the antiquity of man. It must be confessed that the prejudices prevalent some years since, among all classes, and even among scientific men, were of such a nature that they could only be removed by an accumulation of evidence.

In order to remove these prejudices it was not sufficient to show that human remains are frequently intermixed with the bones of so-called antediluvian animals; for it was objected that man might have entered the osseous caverns long after the extinction of these animals; that ferocious beasts, subterraneous currents might subsequently have imported fragments of his skeleton, or that they might have been

introduced by crevices; and when it was shown that, applied to some special cases, all these interpretations were false, there remained yet that intangible objection, that some unknown cause may have disturbed the soil of the caverns. A question thus put could only be solved by a different mode of investigation. It was now requisite to search for the traces of man no longer in caverns, of which the evidence was rejected, nor in the osseous breccia, but in the quaternary formations, *in situ*, in beds which neither were nor could have been disturbed, since they have preserved their relations with the superficial and lower strata. It was then that M. Boucher de Perthes commenced in the diluvium of the Somme those long and difficult researches of which he has given you a history, in his letter of the 17th of November, 1859.

It is in this ancient and deep bed, which has remained undisturbed for a frightfully long series of centuries, that he, and so many after him, have found the flint implements used by man in combating the monsters of another period, intermixed with the remains of the rhinoceros and the mammoth.

This time the demonstration was complete; but to render it more palpable, more striking, and to render it safe from the last objection of sceptics, a crowning proof was required; it was requisite to discover in the fossiliferous diluvium not merely the remains of man's industry but the remains of his body. None of you doubted that ultimately this final evidence would be produced. Yet years elapsed without your expectation being realized. Who was to be the happy explorer whom chance would enable to ally his name with the discovery of the fossil man? Gentlemen, there is justice sometimes in destiny; this good fortune was reserved to the man who has devoted twenty-five years of his life to the demonstration of one of the greatest truths in science, who, for a long time railed at, or what is worse, treated with contempt, had to struggle against universal prejudices, but who by his perseverance and courage received first some tardy support, until at last this depressed truth broke forth in science. M. Boucher de Perthes has the glory of having finished the edifice of which he has laid the first stone. What must have been the joy of this venerable man, when he was called upon to extract from the diluvial bed the celebrated human jaw which our learned president has some days since shown you. The clear and complete exposition of M. de Quatrefages, the history of the objections raised in London, and which have ended in the formation of an international commission, all this has produced in you a profound conviction of the authenticity of the

fossil jaw; and you have remembered with pride that M. Boucher de Perthes has been for three years one of the six honorary members of your society.

Gentlemen, when, four years ago, some of us formed the project of founding an anthropological society, doubts were raised as to the possibility of success; we were threatened with the indifference of the public. We were, however, not discouraged, and we were right. We were then nineteen; we are now two hundred. Let us then proceed resolutely.

As for myself, gentlemen, I must apologize for having so long occupied your attention; but I cannot quit this tribune without thanking you for the honour you have done me by appointing me general secretary. You might have chosen a worthier, but not a more devoted one.

ON THE SUPPOSED INCREASING PREVALENCE OF DARK HAIR IN ENGLAND.

By JOHN BEDDOE, M.D., F.A.S.L., &c.
FOREIGN ASSOCIATE OF THE ANTHROPOLOGICAL SOCIETY OF PARIS.

It is the opinion of some scientific,* and of many unscientific observers, that light hair is gradually becoming less common in England than it used to be; and, while some confine the bearing of this statement within the limits of their own lifetime and observation, others extend it to previous centuries, attaching great importance to the terms in which our Saxon, Danish, and Norman† ancestors are described as having red, yellow, or other light shades of hair.

I do not wish to discuss, in the present article, the question whether this opinion has any foundation in fact. Some light might be thrown upon it by a careful examination of the national and other portrait galleries; and I incline to think that the portraits of the worthies of the sixteenth century would lend some little support to the notion. I merely wish to point out that if the fact be so, or so far as it is so, it may be accounted for by other causes than those which have usually

* *E. g.* of Mrs. Somerville, Physical Geography.

† Dr. Bird, of Swansea, informs me that the chapel of the Anglo-Norman garrison at Brecon was anciently known as "the chapel of the red-haired." This is a rather striking fact, as red hair is not uncommon among the South Welsh themselves at the present day.

been assigned to it. In the first place, the large towns, and other more civilized and populous parts of England, have for some time past been receiving constant streams of immigrants from Ireland, Wales, Damnonia, the Highlands, and other Celtic districts, in which dark hair abounds. In the second, I am disposed to think that the xanthous temperament, though probably better adapted to the climate of these islands than the melanous, is less able to endure some of the anti-hygienic agencies which operate on the crowded populations of our great towns; and that thus the law of natural selection operates against its multiplication. And, in the third place, as a large minority of women live and die unmarried and without offspring, it is probable that the physical qualities of the race may be to some small extent moulded by the action of *conjugal* as well as of natural selection. In order to test the tendency of this hypothetical influence, I have extracted from my note-books particulars of the social condition (viz., whether married or single), and of the colour of the hair, of 737 women, aged between twenty and fifty, who came under my observation at the Bristol Royal Infirmary: these I have thrown into the form of a table, which will, I hope, be sufficiently intelligible.

Social Condition.	COLOUR OF HAIR.					Total Number.	Per Cent.
	Red.	Fair.	Brown.	Dk. Brown.	Black.		
Married* . .	22	52.5	145	234.5	26	480	65
Single . . .	10	35	73.5	73.5	6	198	27
Doubtful+ . .	1	7	21.5	28.5	1	59	8
Totals . . .	33	94.5	240	336.5	33	737	100

The indications of the above table may be rendered more clear by the following one, in which I have assumed the number under each colour to be 100, and have reduced to percentages the different conditions in each class.

Social Condition.	COLOUR OF HAIR.				
	Red.	Fair.	Brown.	Dk. Brown.	Black.
Married	67	55.5	60.5	69.5	79
Single	30	37	30.5	22	18
Doubtful	3	7.5	9	8.5	3
Totals	100	100	100	100	100

* Including widows.

+ These were persons who described themselves by their occupation only: they were probably for the most part either single women or widows.

Lastly, still further to simplify the matter, we may throw together the red, fair, and brown classes under the head of "blonde," and the dark-brown and black under that of "dark," of which two the former will include 367 women, and the latter 369. The results will be as follows:—

Social Condition.	BLONDE.		DARK.	
	Number.	Per Cent.	Number.	Per Cent.
Married	219.5	60	260.5	70.5
Single	118.5	32	79.5	21.5
Doubtful	29.5	8	29.5	8
Totals	367.5	100	369.5	100

The deduction I should make from these figures is, that, whether because the mass of the population does not sympathize with the preference which artists and poets have always manifested in favour of fair hair, or from some other cause, fewer of light-haired women than of dark-haired get married in this part of England.* Then if during several generations this should continue to be the case, is it not probable that the relative proportion of the favoured colour would considerably increase, in accordance with the laws of hereditary influence?

ON THE ABBEVILLE JAW.

By A. DE QUATREFAGES,

MEMBER OF THE INSTITUTE OF FRANCE; PRESIDENT OF THE ANTHROPOLOGICAL SOCIETY OF PARIS; HONORARY FELLOW OF THE ANTHROPOLOGICAL SOCIETY OF LONDON.

Translated by GEORGE FREDERICK ROLPH, Esq.

When I was informed of the discovery which M. de Perthes had made, I speedily proceeded to ascertain the facts of the case as soon as it was possible to leave Paris. At Abbeville I had the good fortune to meet with Dr. Falconer, the eminent English palæontologist, who had arrived there before me. With this competent and highly qualified

* In some young women the hue of the hair continues to darken after they have overpassed the twentieth year, though in others it attains its maximum of darkness within a very few years after puberty. I mention this fact because it may, and probably does, account for a part of the difference between the proportions of the married in the several classes.

judge, who had already studied the question, I visited the place of discovery. The description of inquiry which we carried on together, led both of us to an identical conclusion. We have both accepted as incontestable the facts which M. de Perthes has announced. Nevertheless, we left with the intention of subjecting the specimens themselves to a further examination. It is distinctly understood that I leave the geological question on one side. As I am not qualified to pronounce a personal opinion respecting the discussions which are still raised upon the subject of the diluvial soil of Abbeville, I entirely abstain from alluding to it. Speaking of the jaw found by M. de Perthes, I shall nevertheless employ the term *fossil*, which at present seems to me consecrated.

But up to the present time it appears to me certain that the jaw found by M. de Perthes rested in the bed he points out, and that it has remained there since the period when the chipped flints termed *hâches* were deposited beside it. Dr. Falconer had already obtained, with his own hands, one of these *hâches*, and I had found two placed at some centimètres from each other, and at fifty or sixty centimètres beyond the spot where the jaw rested, according to M. de Perthes. I have the honour to submit them to the inspection of the Academy.

But it appears to me impossible, according to the state of the quarry, that these flints should have been introduced there recently. They were taken from the soil after I had myself removed some rubbish which covered them; the spot where they were developed, under the pick of the workman, was at the bottom of a cutting so deeply excavated, as to render a fall of the soil imminent; one of them, at the moment when I perceived it, was yet half retained in the earth which the pick had not yet reached; finally, they were incrusted with the coloured matrix which covers the pebbles of the entire bed, and which is found on the jaw. Besides, when we examine microscopically the mode in which the matrix is distributed on the surface of one tooth yet in its place, we see that it adheres to it by fine granulations, exactly as on certain of the polished pebbles of the bed. Finally, Dr. Falconer has extricated a certain amount of the same matrix even from the cavity of the tooth and the alveoli. Such are the reasons which, independently of the precautions taken by M. de Perthes, lead me to regard the Abbeville jaw as authentic.

We understand the great interest which attaches to this human fossil in every point of view, and in particular in its anthropological aspect. As regards this point of inquiry, the only one which I shall here take up, I have not yet made more than a summary examination; but this examination has already led to some interesting results.

The Abbeville jaw is in a remarkable state of preservation. It does not appear to have been rolled. The extremity of the coronoid process is even intact. This fact would induce us to think that it has not come from very far, and inspires a hope that we shall find some other part of the skeleton to which it belongs.

M. de Perthes has requested that the matrix, which still adheres to some parts of the surface, should be treated with great care. He has, nevertheless, washed the extremity of the coronoid process and a part of the head of the condyle. Here we see that the brown tint which the rest of the bone presents has not penetrated deeply; gravel pebbles, carefully washed, have exhibited to me a similar peculiarity. The matrix conceals some details, especially on the internal face; but it nevertheless permits a nearly complete examination.

When we examine this jaw we are immediately struck with two peculiarities. The angle formed by the horizontal ramus and the ascending ramus is extremely open; the fourth molar,* which alone is still in its place, is slightly inclined forwards. These two characters have been even slightly exaggerated in a drawing which was communicated to me at the time, and perhaps to this cause is due the attention which they at once awakened in me.

Can we here discern a race-character? Before commencing this inquiry, let us remark that in anthropology, as in zoology, the comparative osteology of races, as regards detail, is yet very slightly advanced. This is a new investigation, into which palæontologists, as well as anthropologists, will be obliged to enter, even because of the facts which place the history of man and that of animals in contact.

The openness of the angle of which I am speaking is one of those characters which are liable to variation on account of age and other circumstances, apart from individual peculiarities. Amongst the specimens in the Museum gallery, I have found that in an Esquimaux skull the angle was, perhaps, more open than in the Abbeville jaw; while in another head of the same race it was nearly straight. I have found besides, in various races, examples of equally obtuse angles and of analogous variations. A new examination and exact measurements taken on various individuals of different ages and races are here necessary.

Is the inclination of the molar a race character? Can we recognize in it particularly a sign of dentary prognathism? It is very easy to reply to this last question by examining the incisive alveoli yet intact. These denote a vertical implantation. The inclination of these in-

* *M.* 2 of English anatomists. Ed.

cisors is certainly not different from that which is observed in the most markedly orthognathous races. This is an important fact, because it tends to resolve definitively a controversial point. Some anthropologists, amongst whom are found men whose science and judgment I equally respect, have thought that the negro races, that is to say the essentially prognathic races, ought to have been nearer to the primitive human type, and that the higher races have originated by progressive development, and are, consequently, subsequent to the negro.

But in 1861, in my Museum lectures, I endeavoured to demonstrate that our knowledge of the characters possessed by early man was scanty, vague, and conjectural; but that we could contra-indicate, with precision, some of the attributes which early man did not possess. Resting on the phenomena of atavism, and on philological facts, I believed myself in a position to affirm that the negro race had not been the first to appear; that the white, however high his pedigree might be traced, never numbered the negro amongst his ancestors. The orthognathism of the Abbeville fossil adds another and a more serious argument to those which I had then brought forth. The man to whom this jaw belonged, if the testimony of many eminent geologists is to be relied on, was contemporary with mammoths and rhinoceri, which are extinct. In any case, it remains at present the representative of the most ancient known races, and nothing in the disposition of its teeth reminds us of prognathism, this essential character of all the negro races, and which is perpetuated with so much persistence in the half breeds. I think, therefore, that I am still more authorized to repeat that the negro and the white represent the extreme modifications of a primitive type, which was placed at some distance between the two.

As for the inclination of the molar in the Abbeville fossil, it is certainly not a distinctive character. On the one hand, I have found analogous modification in several skulls of different races comprised in the Museum Collection. On the other hand, the inclination appears to me to have been produced accidentally. The molar which existed in front of that which is yet in place fell out during the life of the individual. The alveolus has been filled up by the process of ossification which in such cases occurs. It can be understood that, before this deposition of bone, the tooth placed behind this cavity could have been forced or diverted easily in the direction where the usual support has been removed. Dr. Falconer, with whom I had the advantage of examining the jaw, has been forcibly struck with the following

peculiarity. The edge of the angle of the jaw, and the hinder portion of the lower border of the horizontal ramus, instead of being vertical, curved slightly inwards. The inner side of the bone thus showed beneath the oblique line a kind of canal, or rather of large sulcus (*gouttière*), which extended almost as far as the chin, and markedly more pronounced than it was in a modern jaw, placed at our disposal by a dentist. I have searched for the facts on this point which might be found in our Anthropological Gallery. I have found very marked traces of inversion inside the angle of the jaw in a Bengalee, a Javanese, and a Bellovacian;* indications only in a Lapp, a young Negress, and an Egyptian mummy. On the other hand, an aged Egyptian mummy and a New Caledonian exhibited this character very markedly, and in a Batavian Malay it is as marked as in our fossil, or scarcely in a less degree. In this manner, various human races exhibit nearly every degree of this character; but, at the same time, the character of inversion is presented in individuals of every race.† Undoubtedly, new comparisons are necessary to demonstrate the value and significance of these characters. To what results can these contrary statements lead us? Without desiring to be too positive, I at present recognize in them the effect of the action of the masseter which acts outwardly, and of the internal pterygöids which act inwardly. The relative weakness of these last explains very well why the masseter commonly predominates. Their accidental preponderance would lead to the habit of grinding the food, a habit often practised by aged persons.‡ As for the canal or gutter, this is merely an exaggeration of that which normally exists. Indeed, at the point is found the sinus *(fossette)* in which the submaxillary gland is lodged. The inflection of the edge of the bone merely renders it more striking and deeper. The same *savant* especially called my attention to the form of the condyle. The lower and inner edge of the head is actually here very slightly marked. Besides, the head is perhaps more rounded and broader outwardly than in ordinary specimens; but these peculiarities cannot be considered as essential characters. In the same race may be observed very great differences. In the Tahitians and the New Caledonians, the head of the condyle is some-

* Classical readers will hardly need to be reminded that the *Bellovaci* were a tribe inhabiting the neighbourhood of Beauvais, in the present Departement de l'Oise. ED.

† I learn that Dr. Falconer arrived at analogous results after comparisons which he made since his return to London. A. DE Q.

‡ This observation was made by M. Jacquart, aide-naturaliste of the chair of Anthropology. A. DE Q.

times almost triangular, with one of the sides of the angle placed outwards, and one of the angles inwards. Does not age, again, exercise an influence in this respect? I should consider so, from the great cavity which is presented by the sigmoid notch. We thus see how it is necessary to institute further studies and comparisons before we pronounce on the real value of the peculiarities of the Abbeville jaw.

Thanks to M. Lartet, I have been able to compare this jaw already with the median portion of an homologous bone, collected by him in the rubbish of the Aurignac cave, and with the body of the same bone discovered by M. de Vibraye in the grotto of Arcy. M. Pruner-bey has been good enough to unite with M. Lartet in the comparative examination which we have made of these precious remains. On all these points we have found ourselves of the same opinion. In the pieces which are common to all three bones, they present slight differences, but also resemblances. Thus, the gutter or canal of which I have just spoken, can be recognized on the Aurignac jaw, as on that of Arcy, although it appears perhaps a little less marked on the first. Here, also, we can only see the depression which I instantly recognized. As for the Abbeville jaw; it has appeared to all three of us to be that of an individual probably aged, undoubtedly of small size, or at most, approaching towards the medium size.

I shall add, that in this jaw, absolutely nothing tends to support the theories sustained by some bold minds, which make man to have been descended from the ape by means of successive modifications. This jaw is rather weak than strong; it entirely indicates man, and it has nothing of the *ferocious* physiognomy, if the expression is permitted to me, which the same part of the skeleton offers in existing races. Finally, it is easy to ascertain, between the lower jaws of individuals and of existing races, differences as great and as marked as any of those which distinguish the Abbeville jaw from many of the jaws in the Museum Collection. In other words, these differences, on every point, enter within the existing limits of variation.

It will be conceded that I only present the present note as a first sketch. The Academy has been able already to see that the anatomical and anthropological questions which this human fossil brings forth are numerous and delicate. To be resolved with exactitude, minute and prolonged researches are necessary—researches which I could not make in so short a time, and in the midst of pressing occupations. But I have thought that these few details would not be uninteresting. Without doubt, in a question so grave, a single fact, however well

demonstrated it may appear, cannot be considered to lead to a definitive solution. But I am convinced, there will be human fossils, as there are *hâches* chipped by the human hand. Since attention has been drawn to these last, they have been discovered, not at Abbeville alone, where M. de Perthes had first found them, but everywhere. Now that the existence of human remains in the same beds seems to be placed beyond doubt, we shall not fail to discover other specimens, if they really do exist, provided we search for them. But whatever are the scientific riches brought to light, it would be a crying injustice to forget that it is to the ardent convictions, the indefatigable perseverance of M. de Perthes, that we owe this double discovery, one of the most decisively important which could be arrived at by the aid of the natural sciences.

Before reading the above note, M. de Quatrefages placed on the table the jaw which is the object of the communication, and which M. Boucher de Perthes had confided to him; two *hâches* which he had extracted with his own hands, one from the rubbish made by the workman, one from the actual side of the quarry worked in his presence, and which yet bears a covering of the matrix which can be seen on the jaw; finally, a box filled with this matrix. He further announced, that M. Chevreul had kindly consented to analyze the composition.

HUMAN JAW DISCOVERED AT ABBEVILLE IN UNDISTURBED EARTH. —NOTE FROM M. BOUCHER DE PERTHES.

Communicated by M. de Quatrefages.

A long experience having taught me that one of the causes which prevent the naturalist from discovering human remains in the soils which he explores is the practice which the excavators have of allowing the remains to be lost, I have for several years offered a rather large reward to those who might bring me any, promising to double the recompense if they showed me these remains before they were disturbed, or in the place where they had been discovered. From this moment, many were presented to me; others were pointed out to me which I went to examine *in situ*. In these remains there were some very ancient, some very curious, but none that were fossil.

Towards the end of 1861, in excavating in the sand of Moulin-Quignon, a bed situated near Abbeville, at thirty metres above the level of the Somme, I remarked at four to five metres below the soil a bed of brown sand underlying the upper bed of yellow or grey sand, and reposing on the chalk. This argillo-ferruginous bed, nearly black, impregnated with a colouring matter which stuck to the fingers, and

which should contain organic matter, varies from thirty to sixty centimetres in thickness; it is distinct from the upper bed, and follows all the undulations of the chalk on which it lies at a depth of four to five metres from the surface.

During the year 1862 and the first months of 1863, as the quarry of Moulin-Quignon remained open, I was able to study this bed, and I found therein many flints chipped into implements, some very coarse and different by their colour and by their cutting, from those of the upper bed; the others much better made, seldom rolled and little worn, a fact which I attribute to the bed being less pebbly than that immediately above.

The state of preservation of these *hâches*, due to the absence of large flints in this bed, and as I have said, a certain indication of organic matter, led me to hope to find therein bones or skulls. I said so to the *terrassiers*, repeating my direction to them to leave in its place anything they might discover.

On the 23rd of March one of these *terrassiers*, Nicholas Halatre, brought me, in a mass of sand, two flint *hâches*, found at a depth of 4·50m. At fifteen centimètres lower, near the chalk, there was in the same sand a fragment of bone, or what he took for one, but which, after having detached the matrix I recognized as a human tooth. Half an hour afterwards I was at Moulin-Quignon, and saw the place whence the two *hâches* and the tooth had been derived; and the report of Halatre was confirmed by the other *terrassiers*. From the discovery of this tooth I might have concluded that the jaw was at hand; I had the earth opened, and found a third *hâche*, but night coming on interrupted my investigations. The following day, the *terrassiers* being employed elsewhere, the work was suspended.

On the 26th, I engaged two other workmen, Dingeon and Vasseur, to continue the digging.

On the 28th Vasseur came and brought me a second tooth, found not far from the place where the first had been discovered, adding that by its side was a bone, or something like one, of which he could only see a small part. I immediately went to the quarry, accompanied by an archæologist of our town, M. Oswald Dimpre, a skilful draughtsman, and well known to the geologists who have visited our quarries. Arrrived at the bank, after having found the excavation just as I had left it, at five metres below the soil, I perceived in the black bed the end of the bone which Vasseur had mentioned. This earth was very compact, and it was necessary to be careful, in order not to do any mischief. I caused the soil around the bone, of which

I saw the extremity, to be detached, and in spite of a mass of sand which adhered to it, I recognized the half of a human jaw. At twenty centimètres distant, in the same black vein, was a *hâche*, which M. Dimpre could only detach after several efforts, and by the help of a pick-axe. Near the jaw I found a second *hâche*, broken, and, below this, a third tooth. Then, in a quantity of the same sand which I had carried home I discovered a portion of a fourth tooth. This human jaw-bone was in the lowest part of the bed of black sand, and at some centimètres from the chalk. The following is a detailed account of the beds which covered it, measured by me, and a diagram of which was made by M. Dimpre :—

	M.
1. A bed of vegetable earth - - - - - - -	0·50
2. Earth undisturbed, grey sand mixed with broken flints -	0·70
3. Yellow argillaceous sand, mixed with large or little rolled flints, superposed upon a bed of grey sand - - - -	1·50
4. Yellow ferruginous sand; flints smaller, and more rolled; below which is a bed of less yellow sand. I have found in this bed fragments of the teeth of *Elephas primigenius*, and flint *hâches* - - - - - - - - -	1·70
5. Black argillo-ferruginous sand, colouring and sticking to the hand, appearing to contain organic matter; small pebbles, more rolled than in the higher banks; flints cut by hand; fossil human jaw - - - - - - - - -	0·50
	4·70
6. A bed of chalk, upon which the bed of black argillaceous sand rests, at a depth of five metres below the surface.	

It is then in the fifth bed, a bed covered by four other beds of sand and clay mixed with flints above it, where was found this jaw, which struck me at first by the perfect similarity of its black tint with that of the *hâches* found beside and below it, and the rolled or uncut flints by which it was surrounded. At first sight this jaw appeared to me to present certain differences from an ordinary jaw. M. Jules Dubois, physician to the hôtel Dieu at Abbeville, and M. Catel, surgeon-dentist, a good anatomist, to whom I showed it, made the same remark. M. Jules Dubois found that the ascending branch was more oblique from back to front than in a man of our day; and that the condyle itself is distorted in the inside, and somewhat low. His conclusion was that this man belonged to another race than ours. His confrère, Dr. Herquet, known, like M. Dubois, by his excellent memoirs upon natural and medical science, shared this opinion, adding that the difference from the ordinary form might be an

anomaly, but that it was so decided as to deserve attentive consideration.

I add here a diagram of the fossil jaw, and a section of the bank at Moulin-Quignon, made under my superintendence by M. O. Dimpre, and from measurements taken by myself. As the first tooth found is a left molar, and as I have only the right part of the jaw, I am now searching for the other half, and am continuing the excavation at Moulin-Quignon. In a few days I shall send the jaw, with any other specimens I may find, to Paris, that I may assist this report by exhibiting them to the members of the academy.

Since the reading of my first notice on the human jaw found by M. de Perthes, in the diluvium at Abbeville, I find that grave doubts have arisen as to the authenticity of this discovery. This circumstance induces me to particularize some facts which I only alluded to in my preceding communication. I wish it first to be observed that, among the persons from whom these doubts have emanated, not one, as far as I know, has personally studied the object upon which the discussion turns.* The greater number have not even seen it. It is upon the examination of the *haches* taken from the bed when the jaw was found that nearly all the objections rest. It is affirmed that those of the *haches* which have been taken to England have all turned out to be forgeries. We are assured, in fact, that flint *haches* have now become the object of a fraudulent ingenuity, and that several celebrated *savans* have been duped by snares laid for their scientific curiosity and good faith. But because one or more of these *haches* have been discovered to be forgeries, does it follow that all are equally so? To reason thus would be equivalent to denying that there are in the environs of Rome medals really authentic or veritable antiquities, because the art of counterfeiting them had been carried to such an extent as sometimes to deceive the most skilful connoisseurs.

In a question of a discovery of this kind each object demands a separate examination, and its authenticity or falsity results from two orders of facts: from the circumstances themselves in which the discovery was made, and the conditions in which the object found

* I ought to except Dr. Falconer. I have just received the *Times* of the 25th of April, and I find there a letter, in which that *savant* declares himself convinced of the fictitious character of the fossil of Abbeville; he now only sees in all this affair a lesson of prudence and of circumspection. He arrives at these conviction from the examination of the *haches*, and of a tooth also found in the quarries at Abbeville. But they do not rest upon *a new study of the jaw*. Thus, whatever weight the decision of a judge of Dr. Falconer's position may have in my eyes, I find nothing to alter in the actual remark, written before the receipt of his article in the *Times*.

was placed; then from the proper characters of that object. It is from this double point of view that I wish first to examine to-day the two *haches* that I have brought from Abbeville.

Having returned to the spot with Messrs. de Perthes and Falconer, I descended into the quarry, and myself cleared away the few remains left at the foot of a slight excavation already made in the sand-bed. I wished thus to ascertain whether the bed where they were going to work had yet been disturbed. It seemed to me that it had not. Yet my examination was not so minute but that a small cavity prepared beforehand, and *in which a false hache might have been placed*, could have escaped me. I allowed then, I say candidly, *a possibility of fraud* to exist. The workman gave, in my presence, a certain number of strokes of the pick-axe, in deepening the excavation, so that a fall of earth would have been result of any want of solidity in the materials. The last strokes brought to light a *first hache*, which I hastened to pick up. This *hache*, found in the midst of the loose earth brought down by the workman, might have been fraudulently deposited in the soil before my arrival; for it was found in the midst of the loose earth, and I was not able to judge of the conditions of its deposit. *The possibility of a fraud* then exists again here. But, in raising myself, I pereeived in the side of the quarry itself, *on a point which the implement had not touched, a second hache.* This one only showed *three or four centimètres* of its length; it was fixed in the gravel, which had evidently undergone no recent disturbance. In drawing it out with my own hands I knocked down a quantity of this gravel which was in immediate contact with it. Here, it appears to me, exist all the conditions under which a *fraud would be impossible.* The circumstances of discovery, then, establish a real difference between the two *haches.* Let us see what is indicated by the examination of their proper characteristics.

The first *hache*, that which had been picked out from the loose earth brought down by the workman, has been washed and brushed with the greatest care; and yet by the magnifying-glass it is seen that the matrix still adheres to the fractures of the edge. It shows ridges and cuttings almost as clear as if they had been made yesterday; its exterior colour differs very little from that of the chips obtained from it; and these, rubbed with the coloured matrix which surrounds the gravel-pebbles of the quarry, take almost the same colour.* Lastly, its surface gives a dull reflection; and we scarcely find traces of

* Yet, by a moderately powerful magnifying-glass, the points freshly broken are easily distinguished. Again, as will be seen presently, the colouring matter of this bed penetrates to a very small extent.

that species of patina, regarded up to the present time as a certain indication of a really authentic *hache*. Yet, placed by the side of a really false *hache*, the one in question is easily distinguishable. All these characteristics are found in certain specimens, the authenticity of which is beyond doubt. M. Gandry has presented some similar ones to the Academy, which he took from cuttings made in a virgin soil, and at a time when, as cupidity had not yet been excited, actual counterfeits had not been produced. M. Lartet has even told me that he has in his possession a *hache* which he regarded for a long time as false, and the authenticity of which was only ascertained by him when, by the use of a magnifying-glass, he discovered dendrites upon its surface.

Thus the *hache* in question is most probably genuine, but the conditions of its discovery admit of the possibility of a fraud; its own characteristics tend towards the doubtful. I will admit, then, provisionally, that it may be considered false; in doing so I certainly go beyond the truth. This *hache* is, at the most, doubtful.*

The characteristics of the second *hache*, which I extracted from the side of the quarry, are different in certain respects. The ridges and cuttings are less clear; the exterior presents brighter reflections, as if beginning to be covered with patina; the fractures which I have made upon some points give decidedly duller reflections; yet the colour of the interior and that of the exterior of this *hache* are similar, or nearly so, in the parts where I have chipped it. But the flints of the same bed manifest precisely the same peculiarities. Another circumstance struck me forcibly, and I thought it at first a sign of recent fabrication. On one of the points where I had washed it, I found a moderately deep fissure, into which the colouring matter has not penetrated. But, in examining the flints taken from the gravel beds of the quarry, I found one which presents upon two points exactly the same feature. These two fissures, analogous to those upon the *hache* and most certainly ancient, do not show any trace of colouring matter. The circumstance which I have pointed out cannot, then, be regarded as a sign of spuriousness;† everything, on the contrary, indicates a perfectly genuine *hache*.

I have said that I had washed the *hache* in question in certain

* M. Desnoyers, who has examined it with care, does not hesitate to declare it authentic. This *savant* has pronounced the same judgment upon other *haches* coming from the same locality, which M. de Perthes has kindly sent me.

† I do not know whether a comparative examination, similar to that which I describe, has been made by any of the *savans* who have repudiated all the *haches* taken from the bed in question; but I have found no indication of it in the communications which have been made to me on this subject.

places, but I have preserved the matrix upon the greater part of its surface; for, to practised eyes, this matrix itself ought to present characteristics of its own, which would facilitate the discovery of fraud if it existed. A minute examination, made by an expert, here became necessary. M. Delesse kindly undertook it. This competent judge has made a lengthened investigation of the *hache* in question, and his conclusion is that it appeared to him impossible to imitate that which he saw upon the *hache*. On various occasions I raised objections; I told him to be as strict as possible, and to study the *hache* with the intention of proving it spurious. He has repeated his investigation, and his reply remains the same. Thus, in what relates to the two *haches* that I have brought from Moulin-Quignon, I think I may conclude, that, if one of them may strictly speaking be considered doubtful or even false, the other presents every possible guarantee of authenticity.

The jaw-bone itself remains. What is to be thought of it? First, let us remark that this question is by no means so intimately linked with the preceding one as some persons seem to think. The *haches* may be genuine and the jaw-bone spurious, or *vice versâ*. The spuriousness or authenticity of a medal found upon any part of the Roman Campagna is no argument for or against the authenticity of a bust taken from the neighbourhood.* We must remark again, that, outside the geological controversies of which the soil in question is the subject, many causes would render it difficult to admit any fact analogous to that which M. de Perthes has announced. On the one side, the discovery of a human jaw-bone, which in its form and proportions completely resembles those seen at the present day, militates against the theories most ardently adopted and maintained by those *savans* who enjoy the highest and best deserved authority. On the other hand, men's consciences are quickly alarmed at seeing the existence of man brought back to an epoch for which there exists at present no possibility of a precise date. These two causes, very different and we might say opposite, have operated in the same manner, and are evidently to be added to doubts exclusively and candidly scientific.† In this state of things what is to be done?

* What I say of the *haches* applies equally to the tooth, the examination of which has so forcibly struck the *savans* of London.

† But these doubts are not universal. Even during the printing of my paper, I learn that Dr. Carpenter, who has studied the jaw-bone at the house of M. de Perthes with great care, has not hesitated to declare its authenticity before the Royal Society. Communications to the same effect have been made to the Anthropological Society of London.

Evidently we can only do with the jaw-bone itself as with the *haches*, and look beyond every preconceived idea for the facts which militate for or against its authenticity. What I have endeavoured to do I will endeavour to do again. Unfortunately, one of the essential elements of the inquiry is in this case wanting. We cannot reproduce the conditions of the discovery; on this point we are all obliged to abide by the report of M. de Perthes. Without the least doubt in the world as to his perfect and incontestable honesty, his opponents may always deem it possible that he may have been deceived. So far as I am concerned, I cannot even pronounce an opinion; for, in a matter like this, to have the right to give evidence one must be able to speak *de visu*, and I was not present at the moment of the discovery.

There remains the examination of the proper characteristics. I have made upon this subject the only experiments at present allowed me. The following is a brief *résumé* of them. I have washed carefully, and rubbed with cotton, a portion of the exterior face. The bone then displayed a pale yellow colour, slightly tinged with brown. By the magnifying-glass it could be seen that the matrix has penetrated the small fractures on the surface, and that it continues to adhere to them. Some pebbles with white markings, found upon the spot, have, when treated in the same manner, shown the same peculiarities. This slight colouring of the jaw-bone is not, then, an indication of spuriousness. On the contrary, it proves that it cannot have been obtained from tumuli, which give to bones a similar colour to that of the Abbeville fossil before washing. I scratched the interior face of the bone and some whitened pebbles, in a similar manner, with the point of a small scalpel. The tool-scratchings have produced almost the same results, allowing for the differences of hardness in the two bodies. I examined very carefully the mode of adhesion of the matrix to the pebbles and to the jaw-bone, and found it in most instances identical. The manner in which this matrix crumbles and falls away in working under a magnifying-glass seems also exactly the same in certain pebbles and in the jaw-bone. On the other hand, some cut flints were carefully washed, and then covered with a stratum of composition made of the slimy matter found in the quarry. This adhered at first, but without showing the characteristics observed on the jaw-bone, on the *hache*, or on the pebbles referred to. Then, when dry, this artificial stratum was readily detached and crumbled in a different manner. Lastly, I handed the jaw-bone to M. Delesse for examination, as well as the *hache* above referred to. This *savant* found in both matrices the same characteristics. In each case he gave as his im-

pression:—"It appears to me impossible that this can have been artificially formed."*

Thus, nothing has yet appeared to confirm the doubts raised as to the authenticity of the jaw-bone of Abbeville. On the contrary, everything tends to support the account of M. de Perthes as to the circumstances of its discovery. But, I am most willing to acknowledge, these researches are not yet finished. The entire jaw-bone must be washed and the water examined, in order to see if anything is contained in it which would cause the matrix to adhere to the surface. A portion, at least, of the bone must also be analyzed for the purpose of ascertaining its composition.

All these experiments must be made comparatively. The last, especially, will only be of use, if another fragment of bone taken from the same or a precisely similar stratum be analyzed at the same time. It is well known how much the preservation of bones depends on the composition of the soil; and of this I am myself able to give a striking example.

In two places in Alsace at some distance from each other, in the environs of Schelestadt and Birchwiller, are found tumuli which, from the nature of their contents, are known to be of the same period and to belong to the bronze age. The first, I have heard, are in a peaty soil; the second, which I have seen, are in a soil entirely sandy. In the excavations near Schelestadt, entire skeletons have often been found with their most delicate parts in a complete state of preservation.† But in the excavations made in my presence three years ago in the forest of Schirein, the almost entire absence of bones was generally remarked. In one of these old tombs was found an entire set of female ornaments, consisting of a girdle, necklace, bracelets, and ear-drops, disposed almost as when they were buried upon the body. But all that remained of the skeleton was a silicified fragment of one of the temporal bones; the rest was decomposed.

From this fact we can understand that, for a case like the one in question to be conclusive, the chemical analysis should be made at the same time upon the disputed object, and upon another of the same nature, which is undoubtedly authentic, and which may be used for the purpose of comparison. Yet even an isolated analysis of the

* M. Lartet took part in this investigation. Like myself, he several times requested M. Delesse to use the strictest scrutiny.

† Unfortunately none of these skeletons, nor even the skulls, have been preserved. Let us hope that the time will come when archæologists will know that the bones from these ancient tombs are as valuable to science as the specimens of brass and ironwork. But how many anthropological treasures have been lost, even in consequence of the ardour of the students of antiquity!

Abbeville jaw-bone would possess real interest, and might afford presumptive evidence. I hope, therefore, that M. de Perthes will shortly permit a piece of this bone to be detached, and even that he will allow it to be separated from its matrix. His well-known love of truta affords us a sure guarantee of this. But we can understand that before this is done he desires that the present condition of the jaw-bone shall be proved by the greatest possible number of witnesses; for this, once destroyed, cannot be reproduced, any more than can the circumstances of its discovery.

(This paper was written when I received the accompanying letter from M. Delesse, who responds to the desire I had expressed, after he had examined the above-mentioned remains.)

Letter from M. Delesse to M. de Quatrefages.

I believe I recollect that you asked my opinion of the curious fossils which have lately been found at Moulin-Quignon. It appears to me that the flint hatchets, and especially the human jaw-bone are really authentic. Their surface is encrusted with a brown manganetic limonite, presenting in some points a metallic lustre in such a manner that its deposition points out an inimitable action of nature herself. On the jaw-bone as on the worked flints, this limonite cements together clay, pieces of flint, and rounded grains of hyaline quartz. The fossils which have been found were evidently similarly deposited. They were enveloped in the brown clay which you have pointed out as lying near the bottom of the diluvium at Moulin-Quignon.

THIRD PAPER ON THE ABBEVILLE JAW-BONE.

By M. de Quatrefages.

The last paper which I had the honour of reading to the Academy respecting this human jaw-bone extracted by M. de Perthes from the Abbeville diluvium, appears to have been interpreted by some persons in a manner which I desire to rectify. It was considered as a proof of my doubts of the authenticity of the discovery. I hope that the attentive reading of my paper will already have shown how little my ideas upon this subject were understood. My first convictions, far from being shaken by the minute and oft-repeated experiments which I made upon the *haches* and jaw-bone, have only been strengthened. The misunderstanding which I am endeavouring to clear up, doubtless proceeds from the general tone of the two papers which I have had the honour of presenting to the Academy. In fact, at the time of my first communication I was not yet aware that all the *haches* brought from Moulin-Quignon had been declared spurious or doubtful, and

that, in consequence the authenticity of the jaw-bone itself was a subject for denial. I confined myself, then, to pointing out the motives which led me to the admission of that authenticity, and to dealing with the anthropological question, which at that time was evidently of paramount importance. But, from the moment when doubt was thrown upon the authenticity of the subject of this study, I have been obliged to endeavour to furnish proofs of it. Now, in a question of this nature, I consider that the man of science should not act like a counsel who brings forward only the facts and arguments favourable to his cause. He ought, on the contrary, to conduct his observations with all the severity that his adversaries themselves could bring to bear upon the examination, to put before his readers the *pro* and *con*, and place them in a position to judge for themselves. This is what I have endeavoured to do; but at the same time, I have very clearly established my own conclusions, viz.—That all my researches resulted in a confirmation of the facts related by M. de Perthes.

I have had the pleasure of seeing my convictions shared by all those who have been themselves willing to verify the facts upon which they rest. M. Delesse, at the close of a second investigation, longer and more minute than the first, remained entirely convinced of the identity of the matrices which covered one of my *haches* and a part of the jaw-bone, of the antiquity of this matrix, and of the impossibility of imitating it artificially. MM. Desnoyers and Gandry have acknowledged the jaw-bone as perfectly authentic, as well as the two *haches* which I brought from Abbeville. MM. de Vibraye and Lyman, who have just been studying flints in Denmark, have expressed the same convictions. M. Pictet, after having examined the jaw-bone with the greatest care, has declared to me that he did not expect to "find in it such marks of genuineness," and has authorized me to repeat before the Academy that he left with an entire conviction of its authenticity. To these testimonies, which begin to counterbalance those hitherto opposed to me, I will add a few brief considerations.

And we will first notice that the greatest objection which has been made to the authenticity of the jaw-bone rests upon the examination of a tooth which has been found, it is said, very white, and preserving at least a great proportion of its original gelatine. I have partly replied before-hand to this last argument. It is evident that the conditions under which any portion of a skeleton is placed would have considerable influence upon its state of preservation. It is evident also that the texture of the part itself exercises an analogous influence. Now, in the whole skeleton no part is so well protected

as the teeth, against the action of external agents. The presence of gelatine, if I am not mistaken, has been demonstrated in various bones, properly so-called, belonging to fossils much more ancient than those of the diluvium can be by any possibility. Would it then be strange that a tooth derived from this latter deposit should still preserve a considerable portion of its first organic substance? Here, perhaps more than ever, the comparative analysis which I mentioned in my preceding paper would have been necessary to authorize the investigators to regard as recent the object experimented upon. Now, no such analysis, that I know of, has been made; the conclusion then being drawn from an isolated observation, is wanting in a positive basis, even when applied to the tooth which has been put in evidence. But, if we admit for the moment that within these limits the conclusion, which yet I do not look upon as legitimate, be well founded, how would this result authorize us to declare that the jaw-bone itself is false? The tooth examined in London does not belong to the jaw-bone. That was a fact proved previously to any discussion. We cannot, therefore, argue from one to the other. Much more, it appears from an account which M. de Perthes has given me, that he himself was in doubt upon the subject of this tooth; and he assures me that he has never been willing to answer for it. How, then, can we derive from this tooth, to which exception has been taken beforehand by M. de Perthes, serious arguments against the authenticity of the jaw-bone. Those who deny that authenticity again fall back on the slight colouring of the bone, and the small depth to which that colouring has penetrated. But these again are peculiarities which depend in a great measure on the composition of the soil, and the nature of the colouring matter. If this be insoluble it is clear it will stop at the surface of the bones, and not penetrate their substance.

I have already pointed out facts which prove that the colouring matter of the stratum here in question penetrates to a very small extent. The following is a still more remarkable case in point. In examining under a magnifying-glass a piece of the base of this bed, M. Desnoyers perceived a fragment, unfortunately very small and very thin, of what appeared to us to be a lamella of a tooth, or perhaps a fragment of shell. Whatever it may have been, this little flake was entirely buried in the coloured matrix. I raised a portion of this matrix, under the magnifying-glass, and merely with a pair of pincers, and the small substance in question was discovered almost as white as paper; at any rate, much less coloured than the bone in

dispute. The colouring matter has not even tinged the surface. How can we be astonished, after this, at the small amount of colouring in the jaw-bone.*

One word more upon the subject of my second *hache*, that which I extracted from the solid side of the quarry. At the suggestion of M. Delesse I washed one of its ends, by pouring boiling water on it. A gravel pebble from the quarry was washed in the same manner. Both were cleaned with equal facility. It will be understood that if, for the purpose of causing an artificial matrix to adhere, gelatine or gum had been employed, either would have been easily detected upon the moistened surface of the matrix. Not the slightest trace was discovered. On the contrary, this washing brought to light on the *hache*, a point where the limonite forms a thin stratum, and follows the sinuosities of the flint, and presents that metallic appearance which so forcibly struck M. Delesse when he made the first examination of these objects.

The members of the Academy will see that in the kind of inquiry to which I have devoted myself I have only to notice to-day facts which are favourable to the authenticity of the Abbeville jaw-bone. Had facts tending to a contrary conclusion presented themselves I should equally have published them; but up to the present time everything argues in favour of its authenticity, and tends to confirm the reality of the discovery made by M. de Perthes.

OBSERVATIONS MADE ON THE JAW-BONE OF MOULIN-QUIGNON.

By M. de Quatrefages.

I beg leave of the Academy to add a few words to the report, otherwise so complete, of M. Edwards. I desire to unite with my honourable colleague in expressing the sentiments of profound esteem which I have been led to entertain with regard to the proceedings and entire conduct of the English *savans* during the few days that we have passed, so to speak, in continuous discussion. It is impossible to bring to bear on a debate of this kind a more disinterested love for science, or a more honourable feeling; or to accept with a more complete frankness facts which have once been established. At the commencement of our conferences conflicting opinions were held, with equal tenacity, and yet the strict minuteness which each one brought to bear upon the subject did not for a moment interfere with their cordiality towards each other; and I am so bold as to hope that this scientific contest has laid the foundation, among all those

* I have preserved this small white substance still encased in its matrix.

who have taken part in it, of a sincere and lasting friendship. I ought to add that the discussion has fully brought to light a fact easily admitted, and which, for my part, I have never doubted. No one could have entertained the idea that men so eminent as Messrs. Falconer, Busk, Prestwich, etc., would lightly, and without serious motives, have embraced the opinions which they came to Paris to defend; and we can understand that the same causes would give rise to doubts in the mind of Dr. Carpenter. I also am willing to acknowledge that these causes existed. In the absence of any other means of judging, the external appearance of certain *haches* after washing, the remarkable preservation of the animal matter in the tooth examined in England, and the consequences which that preservation entailed, might well appear to be a sufficient cause of the conclusions arrived at by our London colleagues. In order to counterbalance the opinion which would result from the establishment of these facts, and to preserve and defend the contrary convictions, it is necessary to possess a thoroughly firm basis, and, so to speak, an absolute point of comparison. Now, these two elements were wanting in the case of our learned friends in London, whilst I had the immense advantage of possessing them. In fact I alone could be perfectly certain that one of my two *haches* was uncontestably authentic; for I alone had seen it in its place in the undisturbed section of the quarry, in a place which the pick-axe had not even touched. Here, as I said in my second paper, all fraud was absolutely impossible. Henceforth, whatever were the proper characteristics of this *hache*, they could prove nothing against its authenticity. On the contrary, the study of these characteristics ought evidently to enlighten me as to the value of those presented by the other objects of the same nature, and by the jaw-bone itself; it ought, above all, to show whether the latter had been fraudulently introduced into the bed where M. Boucher de Perthes found it, or whether it belonged to the same period as that bed.

Now this study, minutely entered upon from every point of view, leads us to admit the contemporaneity of the *hache* serving as a point of comparison with the other *haches* of the same derivation, and with the human jaw-bone. I cannot, therefore, doubt the authenticity of this last.

It will be seen upon how certain a basis the opinion which I have defended rests. Without it, I do not hesitate to acknowledge, my first convictions would, doubtless, have been, if not changed, at least rudely shaken by the weighty facts opposed to them by such com-

petent judges as Messrs. Falconer, Prestwich, Busk, and Evans; without it, perhaps, also, the *savans* who were the first unhesitatingly to accept with me the authenticity of the jaw-bone, MM. Delesse, Desnoyers, Lartet, Gaudry, Lyman, and Pictet, would still have hesitated to give an opinion; and I am happy to thank them here for the confidence which they have testified in the accuracy of my observations.*

But a reproduction of the same fact should have led others to an entirely similar result, and this has actually happened. Since our eminent colleagues from London have had the same elements of appreciation at their disposal, since they have seen *haches* extracted from the quarry—and, above all, established the presence of the *hache* No. 5 in the very sides of the working—since they have been able to compare the characteristics of that *hache* with those of the *haches* hitherto regarded by them as false or doubtful, they have adopted our opinion with the honourable frankness of which they have given proof during the whole discussion.

For the rest, even the discord which has separated us for some days will be very useful to science. "The trial of the jaw," Dr. Carpenter writes to me,† "will take a place among the *causes célèbres* of science." Now this trial has been conducted in such a way, that it appears to me impossible not to accept the verdict carried unanimously by a jury lately so widely divided. The authenticity, then, of the discovery made by M. Boucher de Perches is henceforth beyond doubt.

OBSERVATIONS RESPECTING THE MEMOIR OF M. PRUNER-BEY, AND THE PAPER BY M. ELIE DE BEAUMONT.

For several years M. Pruner-Bey has been engaged in collecting materials for the elucidation of the characteristics presented by the most ancient race in Europe. He is then better able than any one else to take advantage of the discovery made by M. Boucher de Perthes. His labours were at first carried on entirely by the aid of photographs, which I had caused to be taken; but, seeing the importance of the results at which my learned colleague of the Anthropological Society had already arrived, I hastened to put at his disposal the jaw-bone of Moulin-Quignon itself. M. Pruner-Bey has kindly

* M. Alphonse Edwards, who came to study these objects at my house after the reading of my third paper, also admitted their authenticity without any contradictory discussion.

† Dr. Carpenter, who besides has in no way officially mentioned the doubts he may have entertained, adopts all the conclusions of the meeting, and expresses to me his opinion upon the subject in a letter, for which I thank him extremely.

communicated to me in return that which served him as a point of comparison. We proceeded together to a detailed and rigorous examination, which has only served to bring out still more the exactitude of the appreciations of M. Pruner-Bey, and the truly surprising similitude between these two specimens, belonging, one to the stone, the other to the iron age.

The members of the Academy will certainly understand, from what has gone before, that the jaw-bone of Moulin-Quignon, looked at from an ethnological point of view, and with regard to the origin of European populations, possesses the highest interest. This interest, I repeat, is quite independent of the geological question. This is why I have endeavoured, from the commencement of these debates, and again at the last meeting, to distinguish clearly between the question of the authenticity of the jaw-bone and all those which I foresaw would arise from the discussions.

Thus my regret was very great when I saw that the report made no mention of the opinions expressed upon this subject by our illustrious perpetual secretary. Now that is all that I wished to show in my preceding communications; for that is what had been almost universally denied in Paris as in London. It will be understood, then, how important to me was the assent of M. Elie de Beaumont, and how sorry I was not to find any traces of it in the report. I trust that our illustrious colleague will only see, in the expression of this sentiment, another proof of the high value which I attach to his opinion.

May I be allowed to make another observation upon the subject of the paper by M. Elie de Beaumont?

This paper raises two questions, both new, and both entirely distinct from the question of the authenticity of the jaw-bone and the *haches* of Moulin-Quignon. Besides, these questions are, from certain points of view, very different from each other.

First, M. Elie de Beaumont declares that he shares the opinion of Cuvier, and does not believe in the contemporaneity of man with *elephas primigenius*. Secondly, he expresses the opinion that the drift worked at Moulin-Quignon does not belong, properly, to the diluvium.

The first of these questions, that of the contemporaneity of man with certain species of extinct animals, may be solved, it seems to me, apart from geological controversy. I therefore think myself allowed to have upon this point an individual opinion; I should state, that, after having for a long time shared the belief of Cuvier, I have arrived at a contrary opinion.

The second question, that which touches upon the age and origin of the soil of Moulin-Quignon, Menchecourt, Saint-Acheul, etc., is exclusively geological. Once more, I have no pretentions to deal with this last problem, and I intend to remain entirely aloof from the discussions which may arise from it. But for this very reason I must insist upon separating it very clearly from the two others, in order to prevent, as much as I can, a confusion which has evidently been produced in a great many minds.

EXAMINATION OF THE JAW-BONE OF MOULIN-QUIGNON FROM AN ANTHROPOLOGICAL POINT OF VIEW. BY M. PRUNER-BEY.

Considering the discordant views held by geologists in all that appertains to the deposit in which the jaw-bone was found, it will be desirable to inquire whether anthropological science will furnish us with the means of classifying it.

On a cursory examination, this object indicates by its proportions, and by the absorption of some dental alveoli, that it belonged to an individual of small size and of middle age; and I will add that this individual was most probably brachycephalic. The following is the series of facts which argues in favour of that opinion. M. Merlot (*vide Etudes Géologico-Archéologiques*, etc., 1860) showed in the section of the cone of la Tinière, near Villeneuve, three successive ages represented by stages. The lowest bed, representing the stone age, has yielded a brachycephalic cranium, as also have the beds belonging to the bronze age in the vicinity. Lastly, I have established the presence of this type in the iron age, and even among living individuals in the same localities, and I have traced elsewhere the detailed portrait of this type by which the history of man in our countries, according to our present knowledge, commences, without the type being extinct.

In the second place, the palæontological researches and discoveries made in France, though the number of data respecting man be very limited, in no way invalidate what I have just alleged. Thus the human chin-bone found by M. de Vibraye shows by the roundness of its contour that it does not belong to the Celtic race, and by its dimensions that the cranium of which it formed a part, was small, and consequently brachycephalic. The same may be said of the specimen the knowledge of which I owe to the kindness of M. Lartet. This celebrated palæontologist found this outer half-ramus of the lower human jaw in the cavern of Aurignac, associated with antediluvian animals, etc. This bone again strikes us by its smallness, which extends even to the three molar teeth which were implanted in it.

Our last fact appears to me to serve as a touchstone in this question as difficult as it is important. I have in my possession a small series of bones of the lower jaw, belonging to the brachycephalic type of Switzerland. These bones, which have been referred to the iron age, were extracted from an immense gravel tumulus, containing numerous *kistvaens*, in which were found skeletons and their remains for the most part Celtic, and by their side a few with brachycephalic crania, and of small size. Now, one of these last jaws, apart from the prolongation of its coronoid apophysis, corresponds in all its other details with the Abbeville jaw-bone. This applies not only to its form but also to its dimensions. Now if we consider the small amount of stability in the characteristics generally presented by this bone in individuals of the same race, and if we add to that the immense interval of time which separates them, I think I shall remain greatly within the limits of probability, if I presume to enunciate this:

First. That the jaw-bone of Moulin-Quignon belonged to a brachycephalic individual of small size, belonging to the stone age.

Secondly. That we can follow the presence of this race through several successive ages; and

Thirdly. That it has left recognizable descendants among the living inhabitants of the extreme north of Europe, following the western border of our continent as far as Sicily.

Miscellanea Anthropologica.

Egyptian Skulls found at Cologne on the Rhine.—In the year 1847, on laying the foundations of a house near the Orphan Asylum at Cologne, there were found above sixty skulls, eighteen of which had on the right side large iron nails driven in. With them were found Roman vessels and coins of the pre-Constantine period. Professor Braun of Bonn, delivered an elaborate lecture on this subject in 1855, on the occasion of the celebration of Winkelmann's birthday, in which the Professor endeavoured to prove that the skulls belonged to the Martyrs of the Theban Legion, whose name was derived from Thebaïs in Egypt, and who were executed in 286 under Diocletian, the persecutor of Christians, because they would not fight against that sect. Dr. Mayer of Bonn expressed his opinion that these skulls presented all the characteristics of Egyptian skulls.

Within the last few days, there were found almost on the same spot near Weyer's Gallery, a number of similar skulls, some of which also had a large nail driven in on the right side. The Rev. Mr. Schaffrath

of Cologne, is in possession of one of the best specimens, which, as we hear, is to be sent to the Antiquarian Museum of Bonn. (*Cologne Gazette*, June 21, 1863.)

Colonies and Climate—a Prophecy. Extracts from a review of works on Public Hygiene, *British and Foreign Medical Review*, 1842. —"We behold the British race peopling alike the western and southern hemisphere, and can already anticipate the time when two hundred millions of men on the shores of the Atlantic and in the isles of the Pacific, will be speaking our language, reading our authors, glorying in our descent." (*The Principles of Population, etc.* By A. Alison, 1840, v. ii, 348.)

Need we say that the responsibility of British statesmen and of the British nation, is most solemn? In two or three centuries a larger population than exists in the whole of Europe will curse or bless us according as we have given a bias for good or evil to their infant institutions. . . .

Taking a practical view of the high questions started, we should doubt much as physiologists, whether any system of public hygiene could effectually resist the influence of an enervating climate on man, or modify the thick neck and broad jaws of the Mongol so indicative of his destructiveness. It seems to us that the customs and habits created by climate induce changes in the cerebral organization of nations, as well as in the muscular and osseous formation, and that the mental and corporeal qualities which result from these changes becoming hereditary characterize the race.

Climate will, undoubtedly, change the character of the English race. It changes it in India; it is changing it in the United States, and in less than a century will dissolve the union.* It is of importance, then, in marking the limits of new colonies, to consider the ultimate effects of climate, and place natural boundaries between them.

When the United States separate, the northern will coalesce with the Canadas, and these unitedly will constitute the dominant empire of the western continent, and perhaps of the world. These changes will hardly take place without wars, and the length and destructiveness of these wars will depend considerably upon the nature of the boundaries, and the compactness of the territories to be defended. Portions of our empire in India might be garrisoned by colonies. The climate of the high lands in Central Asia so nearly resembles our own (as do also the inhabitants themselves) that Englishmen would not deteriorate there; and would do more for the civilization of Asia and the glory of England, than the innumerable colleges and missionaries in Hindostan.

* It must be remembered that this was written more than twenty years ago. EDITOR.